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03 contents

THE GEAR, THE GADGETS, THE TRIBE

COVER STORY

HYPER DRIVES 38

Solid state drives offer better performance, for a fee. APC looks at how today's SSDs have shrugged off the problems of the past.

REGULARS

Editorial	Editor's letter	06

TECHNOTES

Technotes	All the latest news	08
Feature	The Aussie Kindle	12
Opinions	Reader opinions	14
End User	Reader humour	16
Watchdog	Consumer affairs	18

HOW TO

Quick tips	Tech tips plus reader Q&A	86
Insider tips	Transform your media experience	89
	Real-world lessons	90
	Boost your iPhone's battery life	91
OS Challenge	The good drop	92
Workshops	Make music from numbers	94
	Create your own platform game	97
	Create long exposure images	100
Masterclass	Affiliate marketing	103
	Protecting your home network	106

DOWNTIME

Gear	The coolest tech to look out for	110
Games	The latest games reviewed	114
Chip Chat	The lighter side of IT news	117

APC

Labs intro	Nick's pick	20
Reviews	ASUS Eee PC T91	21
	HP Mini 5101	22
	Pacstar Super Core i5	23
	MSI P55-GD80	24
	Gigabyte GA-P55-UD4P	24
	Altech Typhoon i5	25
	Samsung Galaxy Icon	26
	Navman MY50T	26
	Antec Two Hundred	28
	Corsair HX750W PSU	28
	Axim MR108-N	29
	AMD Radeon HD	30
	Altec Lansing Mix iPod Dock	32
	Logitech Z523 speakers	32
	Sony Bravia KDL-22S5700	36
	Ricoh GR Digital III	37
Roundup	SSD roundup	38
Roundup	Affordable camcorders	50
Exp. Tech	MyBook World 1TB	58
Best Tech	Your guide to the best of tech	60
Builder	Reader and professional PCs	64

ROUND-UP

AFFORDABLE CAMCORDERS 50

You don't need to spend thousands to be able to record good-quality video. APC looks at the most affordable camcorders for Christmas.

04 on the dvd

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editorial

TONY SARNO

I THINK IS PRETTY COOL BECAUSE YOU DON'T HAVE TO PHYSICALLY BUILD A PC TO ENTER

When considering the main coverline for this issue, some obvious ones stood out, like "Turbocharge your PC," "Speed Upgrades" and so on. You get the drift, you've read these lines in PC magazines at least a thousand times, and I would guess that many of them exaggerated the impact of the improvements being written about. I've looked at maybe hundreds if not thousands of PC upgrades over the years — from new CPUs and motherboards to amazing overclocks — and none have come as close to dramatically upgrading the performance of a PC than running the OS off a solid state drive. Since we first did this in the Labs late last year, SSD drives have improved to the point where they are practical and affordable enough for many PC users. Throw in Windows 7's better management of SSDs and you have an amazing PC upgrade. So our headline, Hyper Drives, in the end was homage to the technology itself. Our cover story on page 38, gives an insight into what makes SSD drives such an inevitable addition to the standard PC over the coming years.

Solid State, in a different permutation, has already had a massive impact in other areas of technology. The shift to flash-based storage is revolutionising video cameras, particularly at the low-end of the market, with the arrival of mini HD cameras. No longer needing to pack tape or even hard disk drives into a videocamera housing, makers are now shrinking them and making them more affordable. For less than $500 you can now get full HD recording quality, which makes me cringe at the fact that I spent $3,000 on a mini DV camera three years ago. Such is the momentum in this space that several new vendors have entered the market since our enthusiastic review of the Mino Flip HD last month, and our comparison on page 50 throws up some surprise results.

Meanwhile, our Master Builder competition continues to grow, and has launched a new challenge sponsored by ASUS (page 72), which I think is pretty cool because you don't have to physically build a PC to enter it.

tsarno@acpmagazines.com.au

ADVERTISERS INDEX

Altech	118, 128, 130
Anyware	120, 121, 129
AOC	73
ASUS	19
D Link	47
Epson	132
First International	119
Freenet	37
Gamedude	23, 31
Garmin	27
Hewlett Packard	33
IBM	7
Ideam	25, 122, 123
Kworld	29, 76
Microbe	109
Mindscape	44
Origin	67
Pioneer	131
Ricoh	57
Samsung	5, 17
Scorpion Technology	126, 127
TEG	124, 125
Toshiba	116
TPG	2
UYC	88

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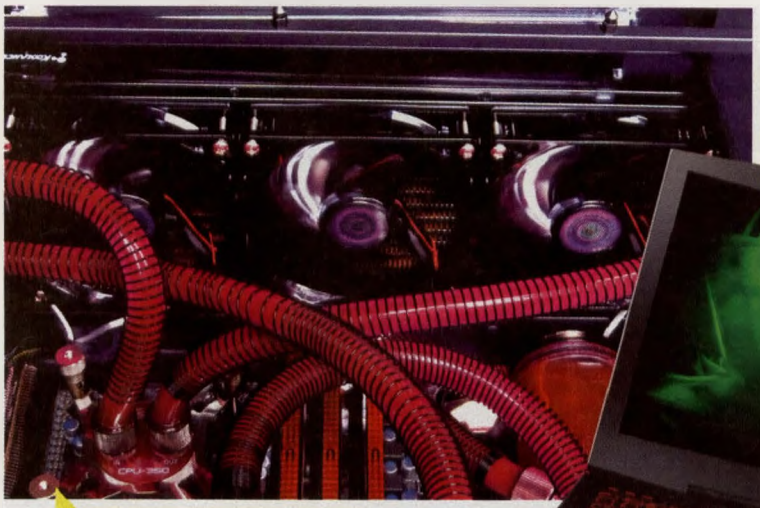
Bytesize
Mini news

VMWARE NOW CREATES
VMWare has finally released a free virtualisation solution for desktops that can generate virtual machines, just like Virtual Box or Microsoft's Virtual PC. Although VMWare is dominant at the big end of town, its free VMWare player would only play virtual machines generated with the expensive VMWare editions. But Version 3 of VMWare player has now fixed this. Download the release candidate from ***tinyurl.com/yf2esdr***

SKYDRIVE EXPLORER
The best thing about Microsoft's SkyDrive is that it provides you with 25GBs of free online storage, and the worst is that it uses a lame file-by-file uploading system — which severely limits its appeal. SkyDrive Explorer is a free extension for Windows Explorer that integrates SkyDrive into your PC, just like it was a folder. You can now use drag and drop for file operations and create links to SkyDrive folders. Download it from ***tinyurl.com/yfjhhm9***

FREE WINDOWS 7 E-BOOK
Microsoft evangelist MitchTulloch has released a short e-book on the troubleshooting tools that are built into Windows 7. It's not too long but full of useful advice. Download it from ***tinyurl.com/ykdv3yv***



COOLER THAN COOL
Origin PC aims to recreate the old Alienware philosophy of the best parts for the purpose.

MOUTH-WATERING
Dell-owned Alienware's Core i7-based M15x, which the company touts as "the most powerful 15in gaming notebook."

THE ORIGIN OF ALIENWARE

Wanting to recreate the extreme performance PCs that made Alienware great, some original staff create a new company.

Now owned by Dell, Alienware has just released a range of high performance machines most users would die for. But to the true believers, Alienware is no longer what it was, a brand bought by a giant corporation whose policy of buying parts in mass quantities means Alienware PCs are more affordable, but not as extreme as they once were.

Some of these true believers were among the founding staff of the original Alienware. Max Wasielewski, who ran Alienware's sales and marketing department, has teamed up with two other Alienware managers to launch Origin PC, a new company which he says, "is building gaming PCs by gamers for gamers not shareholders." It was a year after the Dell takeover in 2006 that Wasielewski and his partners decided to leave and form their own company. "Dell was a different company, it was more about buying in quantity than getting the right parts. It was 'how can we save a dollar on the next 3,000 PCs?' and it would choose a motherboard that was not necessarily the best. With Origin PC, if the best motherboard is out there we'll offer it."

What's unique about Origin PC is that its web site (**originpc.com**) lets you configure your PC in great detail.

"We are changing the experience of how you order a PC online. At every level of the build you have an extreme number of options available. We'll offer five different chassis at launch, then you can choose your design, in nine custom colours, then you can select from graphics that we airbrush on. We will offer different motherboards, different memory, different hard drives and, as far as liquid cooling, a huge number of liquid cooling options."

Alienware was putting its own spin on its own release last month of a new range of notebooks and desktop PCs. "Every product choice we make is absolutely top shelf," said Evan Williams, consumer business manager for Dell Australia. "It's always the fastest memory, always the fastest hard drive, the most powerful chipset."

Alienware released a new range of Core i7 systems, including the 15.6in Alienware M15x, which the company touts as "the most powerful 15in gaming notebook in the universe" and four, liquid-cooled desktop machines built around the Core i7 900-series processors. Prices kick off at $2,499 both for the notebooks and desktops.

TOP 10 ...NEW UBUNTU FEATURES

Ubuntu 9.10, codenamed Karmic Koala, has some significant new features.

1 IMPROVED BOOT PERFORMANCE
Ubuntu switches to the Upstart init daemon from the old System V init, improving boots by 30%.

2 SOFTWARE CENTER
Visually improves on the Add/Remove tool in the Apps menu.

3 UBUNTU ONE
Ubuntu's web-based file storage and synchronisation service is integrated into the OS.

4 ENHANCED GNOME
Includes new version of GNOME and replaces Pidgin as default IM client with Empathy.

5 KERNEL BASED MODE SETTING
The new 2.6.31 kernel comes with graphics mode enabled for Intel graphics hardware.

6 EXT4 FILESYSTEM
Ubuntu now uses the advanced ext4 filesystem.

7 GRUB 2
Is the new default boot loader replacing the "Legacy" boot loader.

8 HOME DIRECTORY ENCRYPTION
Lets you encrypt the home directory — as well as specific folders, using eCryptfs.

9 INSTALL PROCEDURE
The new install process shows more info and is much slicker.

10 INTEGRATED DEVELOPMENT
'Quickly' makes it easier to develop Ubuntu applications.

CURVE 8520
The new consumer 8520 comes on a more affordable plan that should get this BlackBerry to a wider audience.

BOLD 9700
The new flagship BlackBerry for power users has a better screen and works with Optus and Vodafone HSDPA.

New BlackBerries

RIM's strategy is to flood the market with variants of the BlackBerry.

RIM has launched a cheaper BlackBerry, which is aimed at consumers and small businesses as a replacement for ageing BlackBerries. Like the Curve 8900 released earlier this year, the Curve 8520 eschews 3G in favour of GSM. It also sports somewhat funky styling, ditching the conventional faux chrome plastic trim for rubber sides, under which the side-mounted buttons become bulges. Other changes include parking quick-access multimedia keys on the top panel and swapping the 'pearl' navigation ball for a small but responsive optical trackpad.

While GSM is the only mobile network supported, the Curve 8520 also packs Wi-Fi (and of course Bluetooth). GPS also fails to make the cut.

Those omissions help RIM and its carrier partners deliver the Curve 8520 at lower monthly prices. Vodafone and Optus will both offer the Curve 8520. Vodafone was first off the mark at time of printing, with the Curve 8520 selling from $59/month with unlimited email, $350 of talk and text and 50MB of data.

Vodafone is championing the Curve 8520's lower price as a way for small businesses to upgrade older BlackBerry handsets (such as the 8700 series) or roll out BlackBerrys to their entire staff or sales fleet, especially using Vodafone's Shared Business Cap plans.

RIM also launched a new flagship corporate QWERTY device, the Bold 9700. This won't replace the existing Bold 9000, instead swapping the 'pearl' trackball for the same optical trackpad on the Curve 8520. The more compact design brings it closer to the width and height of the Curve, and while this means a slightly smaller screen (6.2cm, down from 6.35cm) the resolution bumps up to a crisper 480 x 360 (it was previously 480 x 320). The camera also gets an upgrade to 3.2MP with autofocus. Under the covers sit the same 624MHz 'Tavor' processor and 1550mAh battery as the Bold 9000 plus 3G HSDPA, GPS and Wi-Fi. 3G coverage now includes 900MHz, so the Bold 9700 can run on the regional HSDPA networks of Vodafone and Optus, in addition to the regular 2100MHz (3G) and 850MHz (Telstra Next G) bands.

The updated BlackBerry OS 5.0 includes a speedier Web browser and more control over Exchange-based mailboxes.

TRIBAL COUNCIL...

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Will you deploy Windows 7 in your business in the next 12 months?

YOU REPLIED

41% 26% 33%

HEAD2HEAD

Google's web-based email and office suite has a surprise competitor from IBM.

More than two million businesses run Google Apps.
$50
US Dollars available from www.google.com/apps
$36
US dollars available from www.lotuslive.com

	GOOGLE PREMIER APPS	LOTUS LIVE iNOTES
What is it?	A web-based email and office suite being adopted by enthusiasts and businesses to replace Microsoft Outlook, Office and Exchange.	An email and collaboration web-based service just launched by IBM which is designed to give businesses a rock-solid web-based option.
Cost	Unlike the free Google Apps, Premier Apps is geared for business and costs US$50 a year per user	US$36 a year per user.
Main selling point	Has grown from an email service into a fully featured, collaborative office suite with online storage around the corner. You can run your business on it. Gives 25GBs of storage to every user.	iNotes comes with industrial-grade security and is backed by IBM's worldwide tech support. Perfect for companies reluctant to put their staff on consumer-oriented webmail services
Cons	Google Premier Apps is fundamentally a consumer service which occasionally suffers from major outages. On the other hand, IBM say there will be no outages with iNotes.	iNotes is quite bare, and each user gets only 1GB of personal storage. IBM is selling the service primarily on its no-outages and security features.
Summary	The feature set and storage space with this all-singing and dancing email and office online suite will continue to grow its popularity with everyone from enthusiasts to large universities.	Its Spartan feature set but corporate-friendly features will make it the first choice with many large businesses who need the reassurance of IBM standing behind it.

PICK 'N' MIX PHOTOMONTAGES

Sketch2Photo turns stick figures into photo-realistic images

Photoshop, already threatened by the numerous free image-editing apps springing up online, may have another piece of software to worry about. Debuted at the annual international computer graphics conference Siggraph in New Orleans, Sketch2Photo could revolutionise the world of photomontage design.

The brainchild of five students from the Universities of Tsinghua and Singapore, the application works like this: you draw a very simple sketch of the photo you would like to create and label each of the sketch's components, then the program automatically compiles a photorealistic image from pictures found on the web. The program uses a filter scheme to ensure the pictures chosen for each component are appropriate. They're assembled to the scale suggested by the sketch and the colours, textures and shading are matched using an image-blending algorithm.

A concept video (**www.vimeo.com/6496886**) goes into more detail of how the image matching is achieved, and shows how numerous combos are presented to achieve results.

If the application behaves as described by its makers, it would be revolutionary — anyone who can draw a simple sketch could be a designer. Even trained art directors would find it useful as they'd no longer need to trawl through image libraries to find what they're after. Instead, they could create it with a line drawing.

The quality of the finished images has yet to be seen, but even if it's questionable, Sketch2Photo will take the pain and cost out of mocking up design concepts, and could even herald a new era of image design.

NUMBER CRUNCHING

29%
INCREASE IN SMARTPHONE SHIPMENTS IN AUSTRALIA IN THE FIRST HALF OF 2009.

330,000,000
Firefox browser users in the world.

25%
FALL IN FILESHARING OVER P2P THIS YEAR — THANKS TO AN INCREASE IN USAGE OF REALTIME VIDEO SERVICES.

THE (A)PC REVOLUTION
DEC / 1999

PACKARD BELL PLATINUM 600

Packard Bell has kept a low profile for a very long time, so it's great to review one of its systems. Based around a 600MHz Pentium and 128MB of RAM, the Platinum 600 is not going to blow your socks off — at least, not until you start playing games on it. The Ziff-Davis CPUmark 99 and FPU WinMark 99 scores are below average, as are the 2D results, but the real difference is in the Half-Life timedemo test. Its Voodoo3 3000 card scored the highest frame rate of any card: an amazing 52fps.

DELL TO OUTSELL

Dell is poised to topple Compaq from its longstanding position as the world's top-selling PC manufacturer, according to new figures from IDC. Preliminary Q3 sales figures released by the research company show that Compaq retains the global top spot, shipping 3.8 million PCs and accounting for 13.8% of global sales. Dell is ranked second with 3.2 million machines sold and 11.6%. However, Dell's sales have grown by more than 59%, while Compaq's by just 20%.

NOT ALL ROSES
It was inevitable that after all the praise, Windows 7 would start receiving some brickbats.

Windows 7: not without flaws

It's had a great reception, but users are starting to find some holes in Windows 7.

Windows 7 has received an enthusiastic reception, but some analysts are already pointing to issues with the new OS.

Richard Jacobs, Chief Technology Officer at Sophos, highlighted significant problems with XP Mode, the software compatibility tool that provides a copy of XP that runs on your Windows 7 desktop. "XP Mode doesn't share security settings, security software or patches with the host," Jacobs said, "or inherit any security from Windows 7." And the real problem? "Microsoft isn't providing any tools to help you handle this extra complexity. XP mode isn't a bad idea, but without built-in management, it's a security disaster."

And while Microsoft hopes improved power management and speed will make Windows 7 the ideal choice for netbooks, a recent online test reported the OS lost anything up to a third of its battery life when pitched against XP. Many netbook forums have threads discussing similar problems, and complaining that Windows 7 is much slower than an XP setup.

When you also consider users' dissatisfaction with some of the user interface changes (Explorer, the taskbar and the Start menu), you can see why some may not be rushing to upgrade.

On the other hand, there are good reasons to believe that Windows 7 isn't another Vista. There are far fewer low-level changes, for instance. Microsoft hasn't totally rewritten the TCP/IP stack or drastically changed the file or memory caching systems, so fundamental new problems are far less likely.

The similarities between Windows 7 and Vista mean that upgrading has less chance of breaking your existing hardware and software; if it works on Vista, then in most cases it should work even better on Windows 7.

Microsoft has focused the majority of its efforts on the areas where Vista was most heavily criticised: reducing its system requirements, improving boot time and overall performance, and cutting security hassles.

On balance, then, we think Windows 7 is a solid step forward for Microsoft and for users. There remain some issues to be resolved through patches and driver upgrades, though, so if you're happy with your current system, you might want to wait a few months before upgrading, when the picture should be clearer.

Mustknow
Essential Knowledge

DRAM'S ROLE IN COMPUTER ERRORS

If you've wondered what's behind many mystery errors or crashes on your PC or server, the kind that happen mysteriously and don't reappear once the system is rebooted, chances are they are DRAM errors. A study by Google and the University of Toronto looked at thousands of Google servers and found that DRAM errors happen far more frequently than first thought. Failure rates were established at 25,000 and 75,000 failures per billion hours of operation (FIT) per Mbit — this is up to 20 times higher than previously thought. An important finding was that error rates shoot up dramatically the older the DRAM. They can be caused by electromagnetic interference, such as cosmic radiation or alpha particles from the very manufacturing materials used to make the DRAM, or by contamination of materials in manufacturing.

Topsite
URL of the month

INSTANT POWERPOINT

The problem of relying on Microsoft Powerpoint is that if you suddenly need to whip up a presentation and don't have access to a PC with Office on it, you're in trouble. The 280 Slides web site lets you create Powerpoint-compatible presentations directly via a browser, and you can download the finished product as Powerpoint files.

www.280slides.com

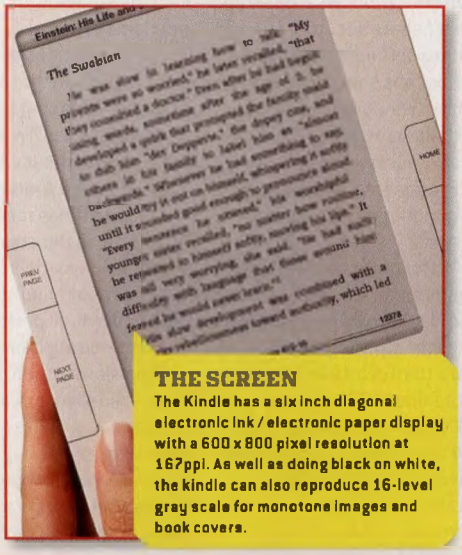
AUSSIE KINDLE

Amazon's Kindle finally makes it to Australia and into our Labs — where we find it both overwhelming and underwhelming.

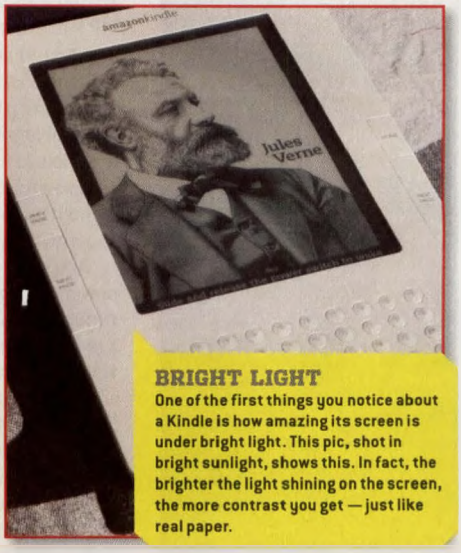
amazonkindle
The Hitchhiker's Guide to the Galaxy
soap, tin of biscuits, flask, compass, map, ball of string, gnat spray, wet-weather gear, space suit etc. Furthermore, the strag will then happily lend the hitchhiker any of these or a dozen other items the hitchhiker might accidentally have "lost." What the strag will think is that any man who can hitchhike the length and breadth of the Galaxy, rough it, know where his towel is, is clearly a man to
Hence a phrase that has passed into hitchhiking slang, as in "Hey, you sass that hoopy Ford Prefect? There's a frood who really knows where his towel is." (Sass: know, be aware of, meet, have sex with; hoopy: really together guy; frood: really amazingly together guy.)
Nestling quietly on top of the towel in Ford Prefect's satchel, the Sub-Etha Sens-O-Matic began to wink more quickly. Miles above the surface of the planet the huge yellow somethings began to
9%
Locations 386-94
4140
US $259
available from www.amazon.com/kindle

TURN ME ON
A sliding switch on the top of the device is used to turn the Kindle off and on. It's all very iPod-like.

NOVEL IDEAS
A book on the Kindle has the same look of a printed novel. Note the handy progress bar down the bottom that tells you how far through the book you are.



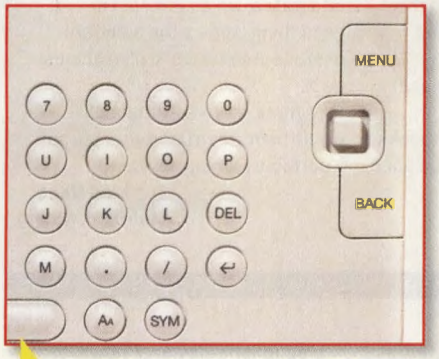
THE SCREEN
The Kindle has a six inch diagonal electronic ink / electronic paper display with a 600 x 800 pixel resolution at 167ppi. As well as doing black on white, the kindle can also reproduce 16-level gray scale for monotone images and book covers.



BRIGHT LIGHT
One of the first things you notice about a Kindle is how amazing its screen is under bright light. This pic, shot in bright sunlight, shows this. In fact, the brighter the light shining on the screen, the more contrast you get — just like real paper.

Few products have arrived into our Labs already established as legends. Amazon's Kindle ebook reader is one — a device so successful in the US that it led forecasts that it would put the printed book out of business within ten years. The version released in Australia is the Kindle 2, an improved version of the first, but with its 6in screen not as big as the new US-only Kindle DX with its 9.7in display. As we passed the Aussie Kindle around the office, you could see at once why it was so popular among US book lovers. It's slimmer than you expect, only 9mm thick, and very light at 300 grams, but what immediately grabs you is that its electronic ink display with 16 shades of grey reproduces the look of a book page like no other electronic device — the brighter the light, the better you can read it. So, as a book replacement, the Kindle is spectacular. But if you want a true electronic tablet, forget it. The Kindle is specialised in the extreme. Since it uses Amazon's WhisperNet (based on AT&T's mobile network, which roams on 3G, Edge and GSM networks in other countries) to connect to Amazon's bookstore, international roaming costs need to be kept to a minimum because Amazon foots the bill. The result is that you don't get photos in the publications, making many newspapers and magazines just long drab slabs of black and white text. The basic web browser, which is available in the US, is also disabled in the international version. In short, the Kindle is really a one trick-pony, great for reading text-heavy books only. But, if you're planning to read a few novels on the beach during the holidays, it's nothing short of spectacular — the ultimate gift for a book lover.

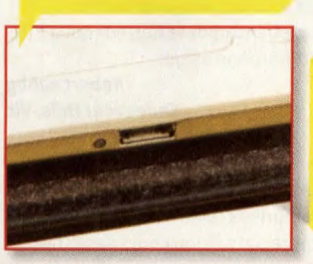
E-INK
The big distinction between the e-ink screen on the Kindle and an LCD screen is that the e-ink doesn't require any power to display an image. So the image remains on the screen while the device is switched off.



QWERTY AND CONTROLS
The Kindle has a physical QWERTY keyboard. The five-way controller on the right hand side is used to move around the screen (there's no pointer, but you can move between buttons/fields and move a cursor through text.)

POWER
Needing 4 hours to get a full charge, the Kindle will operate for up to 4 days with the 3G wireless connection on, or supply you with two weeks reading time with wireless turned off.

PC CONNECTION
A micro-USB cable port at the bottom of the Kindle allows for easy connectivity to either a Mac or PC for direct downloads of books or magazines.



WIRED FOR SOUND
The stereo speakers on the back of the Kindle let you listen to it read books to you using its inbuilt voice, as well as MP3s you've transferred to the device. There's only 1.5GB memory though, so the Kindle won't be replacing your iPod any time soon.

ECO-READER

Using four-greyscale levels compared to the Kindle's sixteen, the Eco-Reader has a 15cm, 600 x 800-pixel resolution screen that allows users to change the type size and font for easy reading. The Eco-Reader's Vizplex "micro-encapsulated ink imaging" technology requires no front or backlight and no power to maintain an image.

It has 512MB of storage memory, which is expandable to 4GB via its SD card slot.

The Eco Reader runs on a Linux operating system and supports a wide range of file formats.

The USB rechargeable Lithium-ion battery is promised to work for an average 7,000 page turns per charge. The Eco Reader comes pre-packaged with 21 free books as an added bonus.

www.ecoreader.com.au

NOOK

Using the same 16-level grey scale e-ink display as the Kindle 2, Barnes and Nobles' Nook, offers similar functionality with a huge library of titles and wireless downloads. It also has a colour, touch-sensitive display for navigation and wireless downloads via a 3G network or Wi-Fi.

2GB of internal memory can store store up to 1,500 titles. It also has a MicroSD slot for increased capacity. The Nook runs a variation of the Android operating system, but currently doesn't support any third party apps.

The Nook also supports ePub, the open e-book format that lets users move titles among machines. With the ePub, lending books is encouraged. Nook owners will also be able to lend books to other users whether they own a Nook, iPhone, Blackberry, or are just reading books on their PC. The loans last for up to two weeks. ***CZ***

www.barnesandnoble.com

14 epinions
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THIS ISSUE'S WINNER

Fred Meng wins a TP-Link Wireless N ADSL/ADSL2+ modem router worth $149. Available from **www.anyware.com.au**

Letter of the month

NETBOOKS A HIT IN SCHOOLS

I am a Year 9 NSW high school student, lucky enough to have received a brand-new netbook, as promised by K.Rudd.

In response to those who criticised the decision to give students netbooks (Epinions, October 09), I want to point out that the Lenovo netbooks are very useful in school.

Sure, they may not be as powerful as an i7 or the new i5s, but they are more than fast enough for taking notes, doing homework or assignments (as long as COD or Spore or whatever game is not running in the background).

It is entirely up to the teacher whether the students use the netbooks in class and if they are relevant for the class ahead. They are an option, not a necessity. For example, netbooks are not used in maths but are used extensively in science and sometimes in English.

The netbooks themselves sport Windows 7 and the Intel Atom n270, found in most netbooks. The N270 is in fact a single-core 1.6GHz "Diamondville" 45nm CPU. The graphics are integrated, which is in fact a good thing, seeing the numbers of students who try to play games on it.

A more powerful notebook would have been used wrongly as a portable gaming device.

Fred Meng
Ashfield, NSW

This month we discover it's not only the telco's suburb coverage you need to check, but your actual house address too.

BLACK HOLES

Recently arriving from NZ, I moved to Wynnum, Queensland. I bought a Virgin wireless broadband modem, based on your mag's review a month or so ago. Asked if they had coverage in Wynnum, the answer from Virgin was "Yeah mate, otherwise we wouldn't stock them." When I got home, plugged it in, and there was no coverage, I rang Virgin. They checked my address, "Sorry sir, everywhere in Wynnum but your place." I took it back and got a refund, swapped to Vodafone, asked if they had coverage in Wynnum and was told "Yeah mate, otherwise we wouldn't stock them." Hmmmm. When I got home and plugged it in it gave me so-so performance for a week or so, and then the problems started. The Vodafone interface saying I was connected, but the web pages would not load, timing out instead. I did a ping, no go. IPCONFIG revealed all information as it should be, but the problem persisted, all day and night. I rang Vodafone's support people five or six times before they escalated me to the black hole of support.

Apparently they would ring me when they had an answer. It's now been 10 days. If I ring Vodafone I can't talk to anyone because, you guessed it, I have been escalated. Wish they could've just done what Virgin did, admitting that my place wasn't covered.

Marty Peet
Wynnum, Qld

JAILBREAKING

In regards to your November Edition of *APC* with the article on "jailbreaking" the iPhone 3G 3.0 — there have already been a couple of jumps in firmware from 3.1 to 3.1.2, which is the latest update to the iPhone OS. The Dev Team have managed to jailbreak the iPhone to this level, but only on the Mac with PwnageTool 3.1.4 found at **http://blog.iphone-dev.org/**, however a guy by the name of George Hotz has created an app called "Blackra1n", which can jailbreak the iPhone on Mac or PC for the latest 3.1.2 version of firmware. This app will jailbreak the iPhone in 30 seconds. After rebooting, start the Blackra1n app on the phone to install Cydia, Rock the iPhone or Icy. The Blackra1n app can be downloaded from **http://blackra1n.com/** and a tutorial can be found at **http://tinyurl.com/yjdsdlh**. Hope this helps. Note: This is a jailbreak app, not an unlocking one, as the baseband update has not got a PC workaround as yet.

Robert Ashby
Endeavour Hills, Vic

NO MEMORY CARDS

Seeing as the bulk of your magazine comprises reviews, I would appreciate if you could pass this feedback on to reviewer David Hague. He reviewed the Ricoh CX1

WHAT RANGE?
How can you tell if your graphics card will play mid-range or high-end games? One reader suggests a rating system.

GRAPHICS CARDS RATINGS

Why is buying a graphics card so difficult? In the recent months I have been preparing to make my first computer, after I unsuccessfully tried to run a game called Team Fortress 2 (through Steam) on my parent's five-year-old IBM ThinkCentre with Intel GMA integrated graphics. I began looking for a nicely-priced graphics card that would run TF2. Most of the responses from the computer specialists started with the phrase, "Are you planning to get into high-end gaming?" I know that a high-end game is something like Crysis (which I have no intention of buying) but then there is this massive grey area in the middle and no-one can tell me what cards are right for that.

I originally had chosen an Nvidia GeForce 9600GT 512MB, only to be told by my local computer specialist that it would not be enough and was then up-sold to a (slightly more expensive) GTS 250. In the November edition of APC in a review of a Core i5 PC that had a 9600GT, it said that "it would be fine for casual gaming." I then tried running a copy of TF2 on my cousin's computer with a GeForce 8800GS. It ran perfectly! Then, in a desperate bid to try and suss out this whole situation, I installed TF2 on my notebook with a 2GHz Core 2 Duo, 2GB RAM and ATI Mobility Radeon 3470. It runs really well.

Can we have a rating system that defines a mid-range game from a high-end game to help with buying cards?

Daniel Valastro
Menai, NSW

on on page 38 (*APC* October 2009) and one of his 'cons' for the camera is the lack of an SD card in the camera box.

Well, as far as I know, no camera manufacturer supplies memory cards with their cameras. I'm surprised that this was a 'fault'. It struck me that David was struggling to either find fault or he had word counts to meet. The 19 words bemoaning the lack of an SD card would have been better used to describe image quality in a manner more useful to readers (instead, he describes picture quality as being 'good'... that's akin to describing someone as being 'nice').

Shawn Low
Melbourne, Vic

IPHONE PUSH EMAIL

In the Blackberry vs iPhone comparison (page 10, October 2009) the article incorrectly states that you need to pay for a MobileMe account to have push email. Using Activesync on iPhone gives push email for Exchange accounts. Yahoo! Mail accounts also push mail to the device, and Gmail now offers push email using Activesync. I have had the opportunity to test the Activesync push and it is almost instantaneous.

Peter Denison
M.D.G. IT Computer Service & Repair

BATTERY MISCONCEPTION

After reading your article about digital cameras I just have to make a comment, as it really frustrates me every time I see this. I have subscribed to *APC* for many years and you consistently report that AA batteries in digital cameras are nowhere near as good as having dedicated Lithium Ion batteries, with you often marking this as one of the negatives that might stop one purchasing said camera.

IMHO, the exact opposite is true. For many years I have worked in the IT industry in public schools and we only choose cameras that take AA batteries. It gives flexibility, including many and cheaper charging options, easy to swap-out batteries if unexpectedly flat, easy to purchase non-rechargeables at the spur of the moment, and they are way cheaper than dedicated batteries or replacing chargers that are lost, stolen or have failed.

In the early days of digital cameras the AAs were low capacity and the cameras inefficient with power, and I feel you haven't moved on from that as we find that the battery charge lasts far above our need before recharging.

Type used — Energiser 2,500mah NIMH or Duracell 2,650mah NIMH. Cameras we choose are mostly Canon compact.

Timothy Smith
Hobart, Tas

apc

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16 enduser

FROM THE READERS OF APC

apcenduser@acpmagazines.com.au

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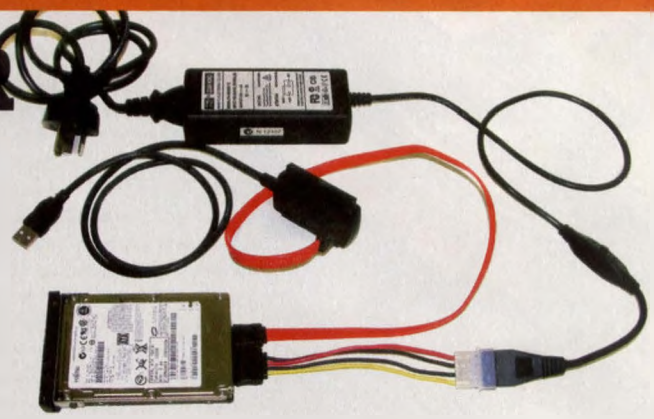
DATA EXTRACTOR



Jeff Williams, a computer repairer from Melbourne, got a call from a friend who said he needed help recovering data from a notebook which suddenly refused to boot. "When I got to his place, I expected to have a look and figure out why it wasn't starting, before even thinking about getting data off it." But the dumb end user had beaten Jeff to it already. With no computer training whatsoever, the user had decided to take the notebook apart himself to get at the hard disk.

"It was unbelievable, the Toshiba notebook was completely taken apart, with bits and pieces everywhere, the whole thing looked like an unsalvageable mess." Jeff asked the user why he'd done this. "He told me wanted to take out the hard disk and try and run it in his desktop PC to see if he could read the data. But he was completely clueless, he'd just assumed he'd be able to stick a notebook drive into a desktop PC drive bay. And in the process he actually damaged the notebook beyond repair."

With data retrieval now the main priority, Jeff picked out the hard disk, powered it up and managed to get data off it, which indicated the drive was not at fault. The end user was very happy, and Jeff has offered to explain how he connected the internal drive to his own notebook.

"First of all, I pull the hard drive out of the device that's not working, and turn it into an external drive. Then I use a SATA to USB converter with a SATA connector that plugs into the drive and a USB cable that plugs into the machine I will use to read the disk. To power the drive I use a power adapter with a Molex connector which plugs into a short converter which in turn plugs into the SATA power port on the drive." Jeff said you can get these parts from any computer or electronics store.

CYBERPHOBIA

Reader Helen (surname withheld) says she would not have believed it unless she'd seen it with her own eyes. "I've heard of fear of flying and similar phobias but I never imagined there would be anyone out there with a computer phobia. When staying the weekend with a friend, I fired up my notebook and began working on some spreadsheets. I noticed that my friend's partner was suddenly looking really uncomfortable, pale, sweaty and giving off a feeling of complete dread. Sure I wasn't imagining this, I shut the notebook down and a little later spoke to my friend about her husband's behaviour. She said 'I'm sorry, I didn't think he'd react so badly, but Peter has serious problems with computers, he is petrified that someone might find out he knows little about them.'"

Helen had came across a cyberphobia sufferer, which is apparently quite a common affliction. So when you're next at a computer and the person beside you is exhibiting symptons from shortness of breath to irregular heartbeat and nausea, they're not necessarily a dumb-end user, but someone with a real medical condition.

WINNERS GET THIS

An amazing LiveScribe Pulse 2GB electronic pen package worth $418.85. The LiveScribe Pulse uses dotted paper technology and an infra-red camera to track its own motion whilst recording surrounding audio. This gives users the ability to sync audio from a meeting, lecture or interview to their handwritten notes. Users can then tap directly onto words or drawings with the Pulse to replay what was recorded. In addition to the $329 pen, the prize pack also includes A4 dotted paper notebooks that work with the pen (worth $34.95) plus an ink refill ($14.95) plus a leather case ($39.95). In all the package is worth a cool $418.85 and it is won by Jeff Williams, who contributed the Data Extractor item. This prize will go to the reader who submits the best item for each of the next four End User columns.

SAMSUNG

A world of Touch

When it comes to individuality, the Samsung GALAXY ICON offers endless possibilities for customisation. It's been designed with the internet in mind and in particular, a Google™ experience like no other. The Android™ platform means you can personalise your entire phone with a multitude of Google apps and have access to high speed internet and Wi-Fi connectivity.

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watchdog

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Google Chrome a privacy concern

An American consumer protection group says that Google's new browser, Chrome, "poses an unprecedented threat to consumers."

Watchdog does not normally cover what consumer watchdogs in other countries get up to, but the US-based Consumer Watchdog organisation has come out with such an attack on Google's Chrome browser that we feel compelled to report it here.

The Santa Monica-based Consumer Watchdog has three main issues with Chrome, which it says "could mark the end of real user control and choice online."

It is worried about communications with Google that are occurring without users' full understanding, consent or control, the blurring of the distinction between local and cloud computing, and Chrome's Incognito mode that "lulls consumers into a false sense of security that their actions are completely private and free from prying eyes when in fact they are not."

INFORMATION SENT FROM INSIDE COMPUTERS: BAD

Consumer Watchdog president Jamie Court said Google's role is now unprecedented because the internet goliath was no longer merely collecting some data about how we search and surf the web. "Its new browser and software are actually sending information from inside our computers to its servers. If Google won't solve its own privacy problems, the company must be prepared for regulators to put the brakes on its unprecedented growth," he said.

The watchdog said most computer users do not focus on the huge amounts of data sent to Google's servers. It claimed that the introduction of Chrome, unless the privacy concerns were addressed seriously and quickly, could mark the end of real user control and choice online because:

1. New asynchronous communications are occurring without users' full understanding, consent or control;

2. Many Chrome features blur the distinction between the desktop and cloud computing, where a computer user's software, documents, data and personal information exist not on the consumer's hard drive but on Google's servers on the internet. This creates confusion in the consumer's mind about the privacy and security of confidential information;

3. Chrome's Incognito mode lulls consumers into a false sense of security that their actions are completely private and free from prying eyes when in fact they are not.

"Chrome provides Google unprecedented dominance over the transmission of computer data and warrants higher privacy standards," Court said. "Chrome represents a once-in-a decade opportunity to raise the consumer privacy bar to new heights that will benefit consumers, content providers, and ultimately Google itself."

IN ESSENCE, COURT WAS CALLING FOR AN OVERHAUL TO CHROME'S INCOGNITO MODE AS FOLLOWS:

Place a single prominent button on the main Chrome interface that can't be hidden or removed and that allows a user to enter Incognito mode instantly without interrupting the user experience. Once in Incognito mode, the application should assume we want to stay incognito, essentially treating Incognito as a default preference once a user has selected it.

Provide clear disclosure on the Google search engine home pages so that users can easily prevent communication with Google before pressing the search button or affirmatively requesting an action. This could be an extension of an omni-present "Incognito mode" button. This disclosure needs to be made clear throughout all the Google applications including GMail, Google Talk, and the Google Toolbar. This disclosure needs to be more than a confusing warning a few clicks away. It should be a convenient, actionable feature so that the user can exercise an informed choice.

Ensure that Incognito mode has the full meaning the word implies when users opt for it. Incognito mode should default to SSL (Secure Sockets Layer) connections, provide an automatic IP anonymizing service, enforce a no-log policy on all Google servers including Google Analytics, as well as disable auto-saving, suggestions, and all other features that use asynchronous event handlers other than button and link clicks. Incognito should disable all external calls to desktop applications and plug-ins whose applications fail to meet equivalent standards.

Court said he looked forward to Google's response and to working with the search engine giant so that Google could become a standard bearer for privacy on the internet. APC

ASUS P7P55D Series Motherboards

Featuring ASUS Xtreme Design with Hybrid Technology

Hybrid Design: Synergy in Action

Experience intelligent optimisation and enhanced performance with Hybrid Technology in the ASUS P7P55D Series. Featuring Hybrid Processor, Hybrid Phase and Hybrid OS for fast and smart operations.

Access the Internet in seconds with Hybrid OS

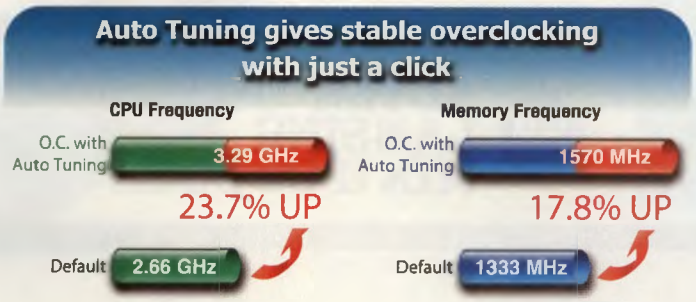
Hybrid OS offers you dual OS options: your main operating system and ASUS Express Gate. When selected, Express Gate takes only a few seconds to load before you can access the Internet. Express Gate also allows access to Firefox, Emails, Music, Photos, Skype, Interactive Flash games and IM, all without accessing your main operating system!

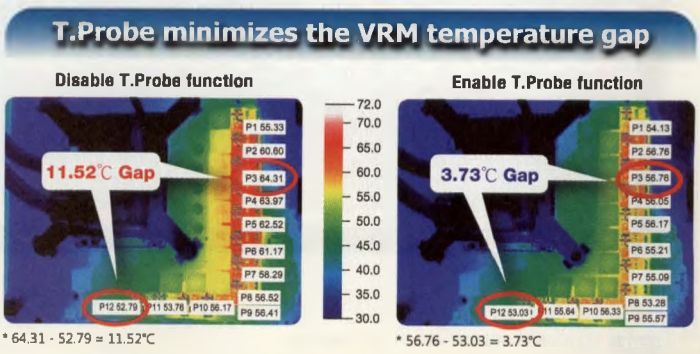
Exceed Performance Marks with Hybrid Processor

Achieve better overclocking results with the TurboV EVO microprocessor! ASUS Auto Tuning allows users to automatically overclock their systems to an extreme, yet stable state simply by pressing a button. The TurboV software also allows adjusting the voltage to several critical components inside the OS to achieve maximum stability. TurboV Remote* allows users to overclock their system via a side controller, even when games or benchmarks are running.

Switch On Breakthrough Efficiency with Hybrid Phase

Hybrid Phase is the unique combination of ASUS Xtreme Phase and T.Probe temperature control. Xtreme Phase delivers smooth and efficient power to the core components in your computer to ensure system stability and longer component lifespan. T.Probe is the world's first active cooling technology, it detects and balances power phases in real time along the CPU, which ultimately results in reduced temperatures around the CPU.





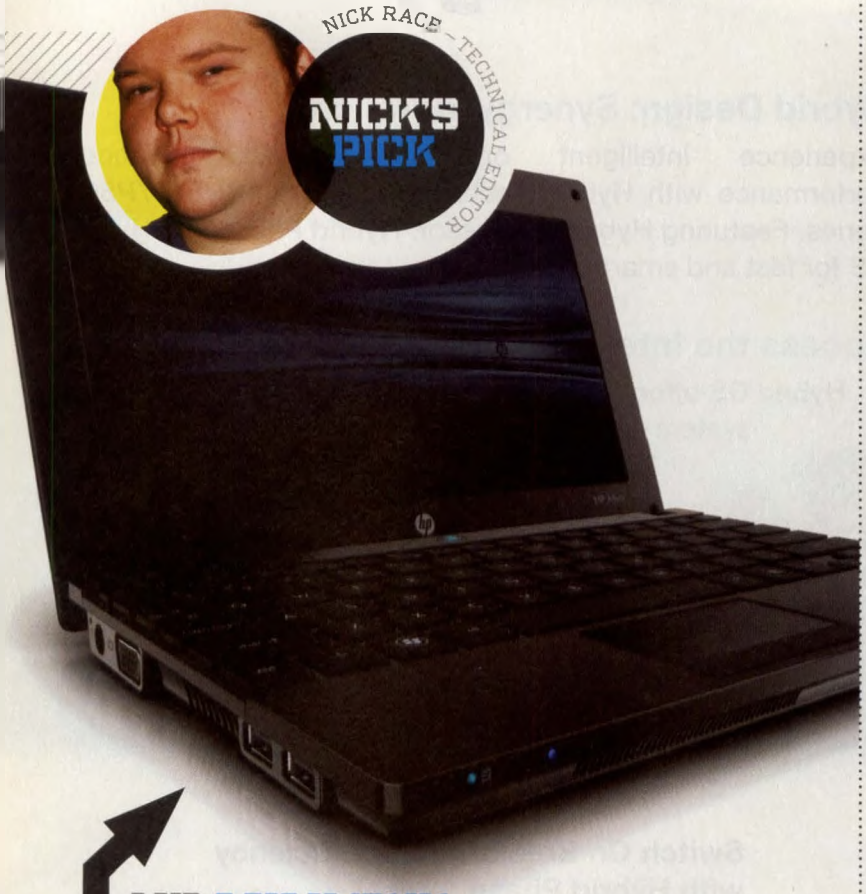
* 64.31 - 52.79 = 11.52℃

* 56.76 - 53.03 = 3.73℃

* TurboV Remote is only provided with some models.

20 thelab

PRODUCT REVIEWS & COMPARISONS



HP MINI 5101

Netbooks can be very dividing. For a group of products that have such similar internal components and specs, the love and hate felt for different models on the market really are astounding. The HP Mini 5101 is one of those models that will inspire a fair bit of netbook envy.

PERFORMANCE ✪✪✪✪✪

The usual Atom processor and a nice 2GB of RAM are matched with a 7,200rpm hard disk drive very rarely seen in a netbook. It makes it feel so much snappier and rates as the fastest netbook we've seen so far.

PRICE ✪✪✪✪

Not the cheapest on the block, but not the most expensive either. The price reflects the quality (and speed) of the components. It's built well and runs nicely. You often get what you pay for.

SETUP ✪✪✪✪

A great keyboard, stunning LCD display panel and some very smooth curves means this netbook can really stand up to hours of bashing away at the keys.

LABS ROUND-UP

HYPER DRIVES

Solid state drives have always offered better performance, for a fee. Bennett Ring looks at how today's SSDs have shrugged off the problems of the past.

38

REVIEWS

ASUS Eee PC T91	21
HP Mini 5101	22
Pacstar Super Core i5	23
MSI P55-GD80	24
Gigabyte GA-P55-UD4P	24
Altech Typhoon i5	25
Samsung Galaxy Icon	26
Navman MY50T	26
Antec Two Hundred	28
Corsair HX750W PSU	28
Axim MR108-N	29
AMD Radeon HD	30
Altec Lansing Mix iPod Dock	32
Logitech Z523 speakers	32
Sony Bravia KDL-22S5700	36
Ricoh GR Digital III	37
SSD roundup	38
Affordable camcorders	50
Exploding Tech: MyBook World 1TB	58
Best Tech	60
Master Builder	64

REVIEW

32 ALTEC LANSING MIX IPOD DOCK

...but it does manage to provide a crisp image with a rich range of colours.
Unforunately, the T91's touchscreen is a magnet for fingerprints...
teatime
4:00 pm.

7/10

ASUS Eee PC T91

Not quite a car crash.

ASUS
www.asus.com.au
$999

Touchscreen accuracy; great battery life; netbook and tablet. ✔

Tablet functionality still wanting; average CPU and HDD. ✖

SPECIAL FEATURES *i*
Five-hour battery life
Touch functionality

Given the rather average results we've seen over the years, most notebook manufacturers still have a hard time putting a decent tablet together. So when we heard ASUS was creating a netbook that doubled as a tablet, you can imagine our scepticism. Debuting at the CES show in January 2009, the ASUS Eee PC T91 has finally winged its way into our Labs. It's the first netbook to hit the market with a touchscreen, so we're not surprised to see a slightly higher price tag. As a first-gen device targeted at those who want touch functionality combined with the convenience of a netbook, has ASUS managed to pull off a small miracle with this "netlet"?

The T91 is a very slight device, small even by netbook standards. This is due in part to the 8.9in touchscreen, which is slightly smaller than the 10in displays used in most other netbooks. With a native resolution of 1,024 x 600 pixels, it provides a very crisp image with a rich range of colours. It's fronted with a glossy finish that loves to soak up fingerprints — a surprising decision considering how often it's going to be touched.

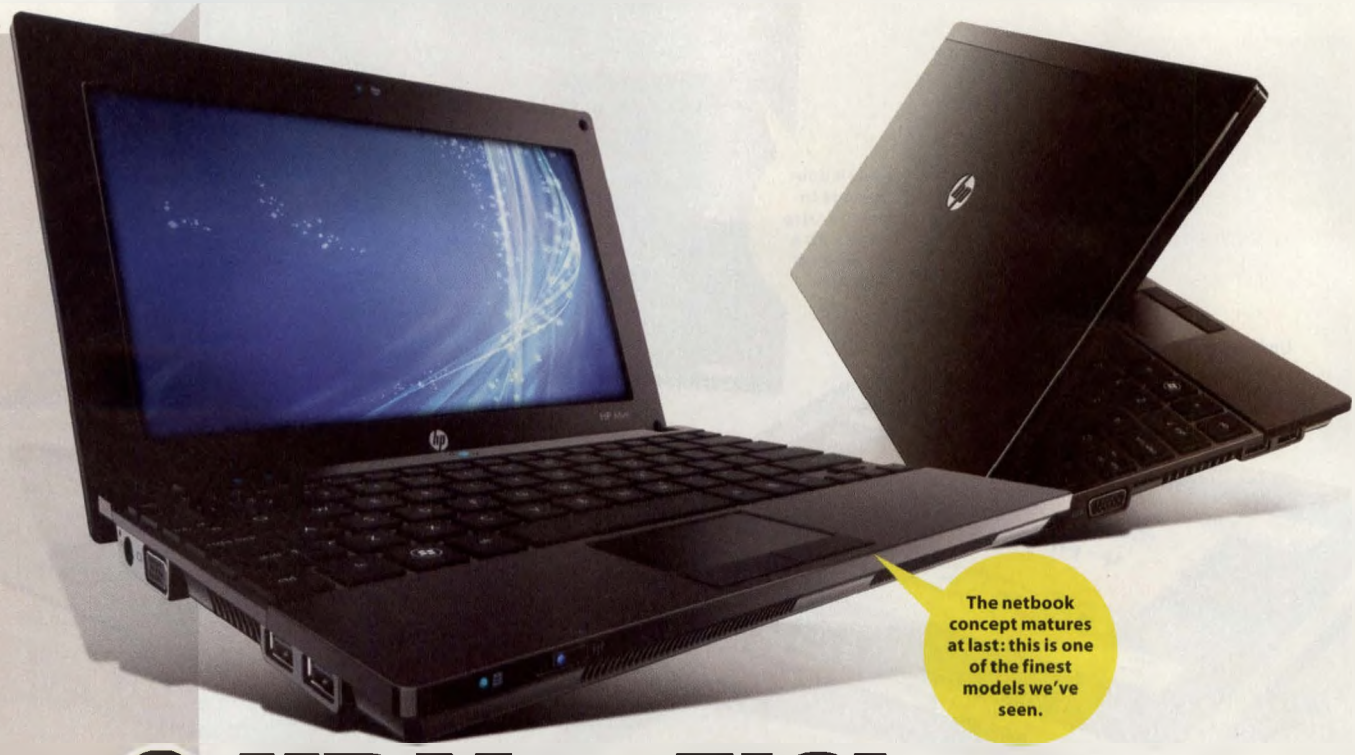
Upon first firing up the T91, a nine-point calibration test runs to ensure optimum accuracy. Using fingertips, it's accurate enough for basic Windows XP navigation, but the on-screen keyboard didn't give us the best results. Trying to type "Bennett is testing touch screen" resulted in ""bwennett is testinfgg ttouch acrewen". Strangely, when using this same virtual keyboard to enter URLs, the delete key refused to work, a pain considering how often our input was misinterpreted.

ASUS has tried to make XP more fingertip-friendly with the inclusion of TouchSuite. This proprietary add-on is very similar to the OS X dock, but only has room for five main applications. By default, several of these are also proprietary apps created to work best with the touch interface: Memos, FotoFun and Notepad. Strangely, we couldn't see an easy way to add our own apps to the dock. TouchSuite also adds a new Widget desktop, which replaces the XP desktop with a collection of, you guessed it, widgets. To get back to the normal desktop is a simple matter of swiping sideways on the screen. In all, the touch functionality is acceptable, if not particularly impressive.

The hardware powering all of this tactile trickery isn't quite up to standards. The Intel Atom Z520 is a bit of a lightweight, although it does help this netbook's claimed five hour battery life. In use, we found it very sluggish for even the most basic of tasks such as surfing the net. We hit the video-rich YouTube home page, where it took up to two seconds for our scroll request to register. Playback of YouTube videos ran at around 8 frames per second, yet DivX clips were smooth and stutter-free. 1GB of DDR2 memory is acceptable, but the hard drive space is severely limited. The 16GB SSD paired with a 16GB SD card is going to fill in the blink of an eye.

Despite a few rough edges, we're impressed with ASUS's first attempt at merging the tablet and netbook markets. We were expecting a car crash, yet found a car with an engine in need of a tune. We eagerly await the second iteration of this exciting combination of technologies.

Bennett Ring



The netbook concept matures at last: this is one of the finest models we've seen.

9/10

HP Mini 5101

Like a netbook, but so much more.

HP
www.hp.com.au
From $599

A sexy black little number; sturdy construction; performance.

We had to send it back to HP after the review.

SPECIAL FEATURES
10.1in 1,366 x 768 display
1.2kg
9 hours battery life

APC MAGAZINE apc EDITOR'S CHOICE

HP bills the 5101 as a mini notebook PC, but don't let the marketing material fool you. In case its 1.2kg weight and 10.1in display didn't give it away, the 5101 is a netbook masquerading as something more. And yet, after spending some quality time with this black little number, we're a little hesitant to lump it in with the rest of the netbook lot.

For starters, unlike the slabs of dull plastic that most netbooks pass for, the 5101 is a very sexy piece of hardware. The top of the chassis is sleek black anodised aluminium, while the rest of the body is covered in a unique soft-touch paint. This coating has a comfortable texture somewhere between rubber and paint. It feels great under your palms, and is very resistant to scratches and fingerprints.

Magnesium alloy is used to stiffen the lower frame, while the brackets holding the display are rock solid. Overall, it's got a sturdiness to it that rivals some of the better notebooks, with looks that leave most netbooks feeling like clunky kids toys.

The keyboard isn't standard netbook fare either. Instead of being a microscopic collection of keys requiring the use of toothpicks to type, the 5101's keyboard is only slightly smaller than a standard QWERTY keyboard. Even adult-sized fingers will be able to use this keyboard with ease. The keys are raised slightly higher than usual, making them even easier to find, and are apparently spill-resistant, though we didn't dare test this claim. An extremely glossy finish gives the touchpad a silky smooth touch, and its accuracy could not be faulted.

Our review unit landed with a 1,366 x 768 display, which was crystal clear considering the 10.1in viewable area. In fact, it's a little too high-res for the size, making the default font and icon sizes extremely small. A lower-resolution WSVGA display option is available for those of us with PC-damaged eyesight.

Under the hood rests the Intel Atom N280 CPU, purring by at a healthy 1.66GHz and residing in the Intel 945GSE Express chipset. This combination isn't going to make your desktop envious but still beats many of the cheaper netbooks we've tested. 2GB of RAM is standard for a decent netbook, but the 7,200rpm hard drive certainly is not. If you've got a little extra cash to spend, a couple of SSD options are also available for even snappier performance. These components combine to provide a responsive platform for the Vista Basic OS that is standard on the 5101.

While many users would prefer XP on such low-end hardware, it was quite nice to have some of Vista's bells and whistles on a netbook without everything slowing to a crawl. Helping to keep things running at a brisk pace, the usual HP software frills are noticeably absent. Not such a bad thing really, as most users would uninstall them anyway.

An area where the 5101 is definitely more net than note is its battery life. At nine hours for the optional six cell battery, this netbook has legs that notebooks just can't match. The price is also in the pricing territory of netbooks, at $599 for the base model.

It's taken a while for netbooks to mature, but the 5101 is a shining realisation of the ultra-portable promise they've offered for so long. With good looks, solid construction and zippy performance, it's one of the finest netbooks we've seen.

Bennett Ring

8/10

Pacstar Super Core i5

Excellent performance at a reasonable price.

Pacstar
pacstarcomputer.com.au
$1,999

Looks good; fast in 2D; good value.

Can get slightly noisy under load; could be faster in 3D.

SPECIAL FEATURES
Core i5 750
GA-P55-UD3 mobo
64GB SSD

Pacstar's Super Core i5 is one of the first commercial systems we've seen to use the new processor. Codenamed 'Lynnfield', it's similar to Core i7 but with a few key changes. It's still quad-core but HyperThreading has been disabled. It supports (slightly faster) dual-channel DDR3 RAM instead of triple-channel and has graphics card controllers moved on to the CPU. It also has a new socket size — 1,156 pins instead of Core i7's 1,366. Ultimately, it's a stripped down version of Core i7 with some newer features. But is it any good?

Pacstar uses the lowest-end Core i5, the 750, which is clocked at 2.66GHz. However, automatic turbo boost will push this up to 3.2GHz (while shutting down unused cores in some applications) to generate extra power when needed. It's embedded in Gigabyte's GA-P55-UD3 motherboard. This isn't Gigabyte's best but still has a two-ounce copper layer in the PCB and all manner of other stability features.

What's more important is how fast it is. With 4GB RAM and a 64GB SSD it scored 5,962 in PCMark Vantage. This puts it just behind TI Computer's, Highly Recommended, Core i7 920-based Extreme Power. However, that costs over $1,300 more, which immediately confirms that Core i5 is a great-value powerhouse. If you want to squeeze out even more performance, it overclocks to 4GHz very easily too.

The graphics card is AMD's last-generation 4870. This scored 9,821 in the standard 3DMark Vantage test. As such it will play most games, but you'll have to turn down the details in some of the newest releases. An extra slot on the motherboard means you can add another if you want more power.

You can also add three more PCI cards, though the existing PCI-E x1 slot is covered by the graphics card. There's also space for three more hard disks and two optical drives. The optical drive will play both Blu-ray and HD DVD movies, and there's an all-format card reader at the front that sports USB and eSATA ports to go with the system's 12 USB ports. Plus: gigabit LAN, optical and coaxial SPDIF.

The Microsoft keyboard and mouse are mid-range, wired business units and work well enough. We like the big 23.4in ViewSonic VX2433WM monitor too, with its 16:9 aspect ratio and its 1,920 x 1,080 resolution. Vista is included, but you can ask for Windows 7.

The Antec Sonata case makes it look good and it's usually quite quiet. However, under load the fans can ramp up. For $1,999 it's a good amount of power for the money and it looks like P55 is going to be a winner. Our only concern is that the graphics card feels a little old, but Pacstar will happily upgrade that.

Nick Ross

APC MAGAZINE apc HIGHLY RECOMMENDED

Lots of power: it's not Core i7, but it's the next best thing.

Built with genuine Windows Vista® Home Premium
FREE WINDOWS INSTALLATION!
XGAMER
Windows Vista Home Premium
Microsoft
Buy any Microsoft Windows Vista or XP with any XGamer system and we will install it for FREE!
WWW.GAMEDUDE.COM.AU
PH: 3387 1500 - ADDRESS: 3353 PACIFIC HWY, SPRINGWOOD, QLD, 4127

9/10

MSI P55-GD80

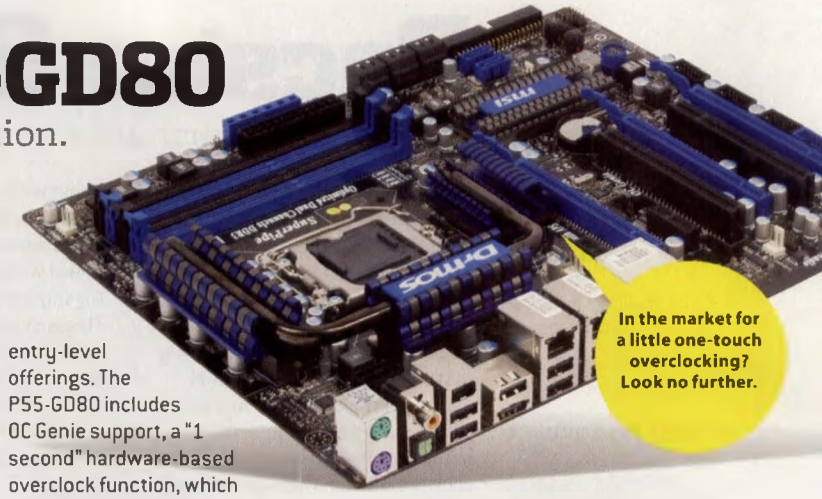
A solid Core i5 solution.

MSI
www.msicomputer.com.au
$389

✔ One-touch overclocking; V-Switch; DrMOS functionality.

✖ Lacks some of the software offerings of its competitors.

SPECIAL FEATURES
Hardware-based overclocking
Power management and control



The P55 motherboards are coming thick and fast here at *APC* Labs, and the P55-GD80 is top of the pops in MSI's Core i5 and Core i7 compatible products. As with the other major vendors, the flagship P55 board is built for overclockers, but there's plenty on offer here for the rest of us, especially if you're building a system to last.

The P55-GD80 has the usual complement of speeds and feeds, a single Socket 1156 for Core i5 and Core i7 800 series processors, four DDR3 slots for dual channel with support for overclocked memory up to 2,133MHz and a max capacity of 16GB. There's three x16 PCI Express slots for triple SLI or CrossFireX, but due to the limitations of the chipset, if fully populated run at x16, x8 and x4. Eight SATA 3.0Gbit/s ports are present, with support for a single powered eSATA connection.

It's the extras that really set this board apart from the mid- and entry-level offerings. The P55-GD80 includes OC Genie support, a "1 second" hardware-based overclock function, which automatically overclocks the CPU within reasonable bounds. Activating it is with a small button on the board, and it's a set-and-forget kind of function. Our testing saw our Core i7 870 quite happily run stably at 3.7GHz, with the press of a button. It can't get easier than that!

MSI has also wrested its DrMOS technology from previous boards into the P55-GD80, including higher efficiency mosfets for less heat, and active phase switching, which adjusts power applied to the chipset, CPU and memory depending on its load. A number of voltage-based features are provided for the keen overclockers, including a hardware-based voltage limit "breaker" and voltage measurement points on the board.

All in all, it's a motherboard with a lot to offer for both the very keen and general users alike. One-touch overclocking works a treat, and with so little effort involved, what's not to like?

Nick Race

9/10

Gigabyte GA-P55-UD4P

Mid-range doesn't mean lacking in features.

Gigabyte
www.gigabyte.com.au
$220

✔ Smart 6; lots of features; TPM.

✖ Would have liked to see the combo eSATA/USB ports on this model.

SPECIAL FEATURES
Smart 6 software package
Trusted Platform Module with Bluetooth support

Judging by the flood of P55 motherboards that are looking to stack up to the ceiling here in the *APC* Labs, the P55 chipset has been very keenly implemented by OEMs. Considering the launch of the Core i7 900 series and the X58 chipset a year ago, which had us scrounging for new motherboards in the weeks before and after the launch, the P55 is a success before it's even started.

It all comes down to two things, availability and affordability. The P55 chipset is not suffering from any lack of supply, and the new single chip design and affordable CPU prices have seen the demand for the new platform hit the roof.

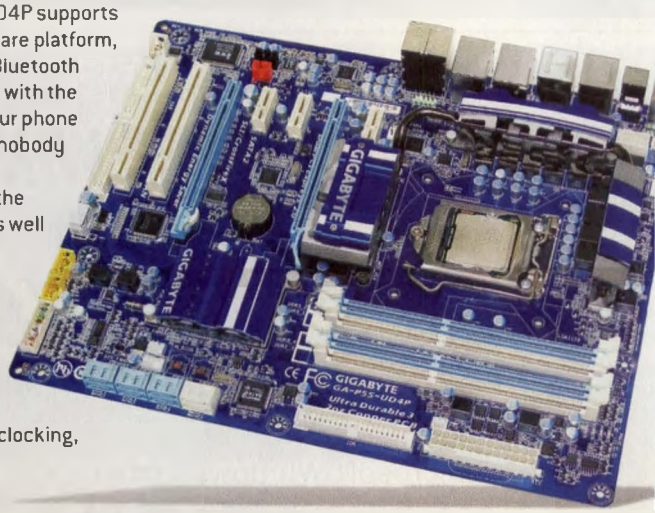
This board from Gigabyte sums up everything that is good about the P55: it's inexpensive, performs well, is packed with features and has some things we've never seen before.

Of course, the requisite Core i5 and Core i7 800 series CPU support, dual channel DDR3, PCI Express x16 (or two x8 for SLI/CrossFire) is all intact, but this mid-market board keeps adding more functionality. Included is support for 10 SATA 2 devices (using three different SATA controllers) and the Trusted Platform Module (TPM) for added security.

The GA-P55-UD4P supports the Smart6 software platform, and adds a nifty Bluetooth lock functionality with the TPM module. If your phone isn't near the PC, nobody can get in.

On the bench the board runs just as well as its big brother, the GA-P55-UD6, with the main difference between them being extra power support for high-end overclocking, two extra RAM slots, the combo eSATA/USB ports and support for triple SLI or CrossFireX. If those things don't appeal, then the GA-P55UD4P is definitely a strong contender for one of the best P55 boards on the market.

Nick Race



9/10

Altech Typhoon i5

With the new NRG, the answer is blowing in the wind.

Altech
www.altech.com.au
$2,439

Looks great; fast in 2D & 3D; good value; quiet.

One-year RTB warranty.

SPECIAL FEATURES
Core i5 750
ATI 5000-series graphics
DirectX 11 support

Core i5 and its P55 motherboard chipset have truly brought Intel's top-performing processors into the mainstream. The cost of a decent, Nehalem-based processor, plus a motherboard and kit of dual-channel DDR3 RAM is significantly cheaper than a Core i7 CPU, decent X58 motherboard and triple-channel memory kit. Consequently, Altech has released a new NRG system that looks remarkably like its previous systems, although it doesn't sound like it's about to take off, and its price tag is the right side of several thousand dollars. It's also the first machine we've seen to sport ATI's brand-new 5000-series graphics card. So we were dying to see how it performed.

As we saw with Pacstar's 'budget' machine, the 2.66GHz Core i5 750 CPU performs very well for the price. Unfortunately, the similar processor in the Altech system, being an early sample, kept crashing just as it was about to give us a PCMark Vantage score. We expect it to be a touch higher than the Pacstar system (around 6,000 PCMarks) and are confident everything will work by the time you read this review. We've also found that the 2.66GHz chip also happily overclocks to around 4GHz if you want to push things further.

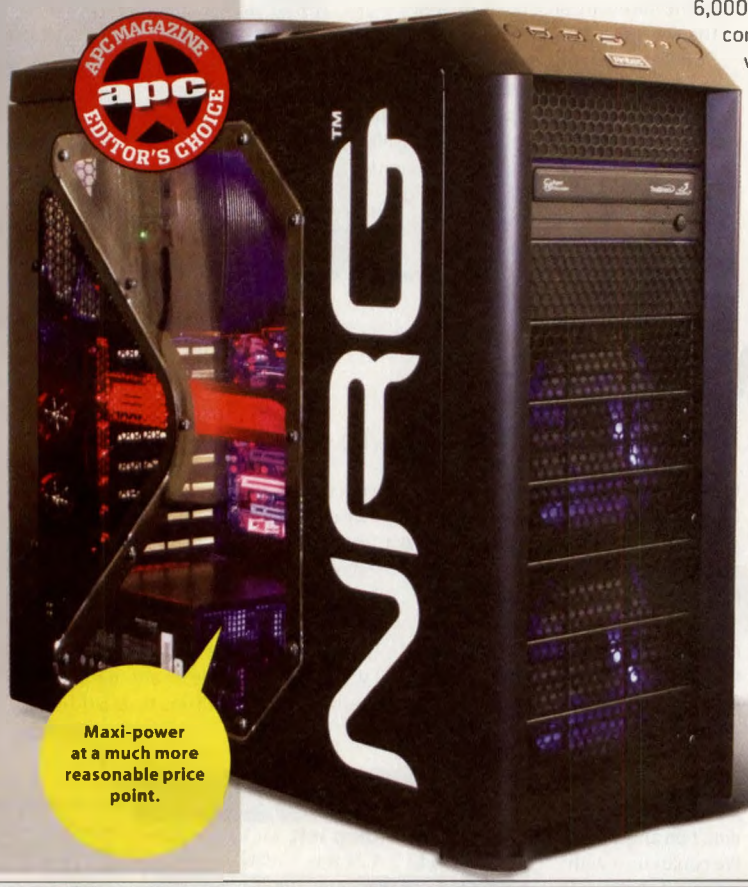
But more about the graphics card, which is the first of AMD's new 'Evergreen' family (which supports DirectX 11), and uses a GPU codenamed 'Cypress'. It has a core clock of 850MHz, 1,600 Stream processors (double the number sported by its predecessor, the 4870) and 1GB of GDDR5 memory clocked at 1.2GHz. Impressively it only uses 27 watts when idling and stays relatively quiet under load. It has two DVI ports plus an HDMI and a DisplayPort (although you can only use two of the DVI and HDMI ports at once) which is fantastic for multi-screen displays and gaming. Another variant of this card, called the 'Eyefinity 6', allows you to connect six monitors at one time. We've also seen demos where four cards together have used 24 screens for gaming. It's impressive stuff.

DX11 games are a few months off, but this is the first card to fully support them. A 3DMark Vantage score of 16,622 means it will happily play everything on the market at present. However, that's much lower than it should be, thanks to early beta drivers. In game tests this card rivals and beats Nvidia's dual-GPU GTX 295. Tests show that boosting performance by adding a second card provides the fastest gameplay on the market.

Elsewhere, connectivity is good, with 12 USB ports plus a couple of eSATA sockets spread over the front and back. The Gigabyte GA-P55-UD5 motherboard is already proven to be the fastest, most-stable and best P55 overclocker on the market. However, having two 500GB hard disks running in RAID 0 felt a bit old: we'd prefer to see higher-capacity models or even an SSD. Inside there's room for five more, plus two more GPU slots, two PCI slots and a PCI-E card. Another optical drive can join the existing DVD writer.

The whole system looks good and mercifully, it all sounds rather quiet. No peripherals are included but by now most people will be upgrading their system boxes and already have them. At two-and-a-half grand this is an excellent all-round system and it will last a long time indeed.

Nick Ross



8/10 Samsung Galaxy Icon

Better than some, but not a market leader.

Samsung
www.samsung.com.au
$749

8GB flash drive; sleek; vivid AMOLED screen. ✔

Limited multimedia support; short battery life; laggy touchscreen. ✖

SPECIAL FEATURES
Google Android
320 x 480 touchscreen
8GB on-board storage

APC MAGAZINE HIGHLY RECOMMENDED

Earlier this year, Samsung pledged it would have three Android phones out by the end of the year. The Galaxy Icon is the first, and compared to the two Android phones on the market from HTC, there's a lot to recommend it over the competition. The 5MP auto-focus camera is better than the 3.2MP snappers on the Dream and Magic, there's a 3.5mm headphone jack, and 8GB of flash storage on board.

The hardware design is nice, if not a slightly cheaper-looking version of the Omnia Icon. A 3.2in AMOLED 320 x 480 touchscreen sits front and centre, and below is a conventional five-way navigation button, flanked on either side by call buttons, back, menu and an unmarked home key. The touchscreen is capacitive, but there's a slight lag before it registers input, and the software keyboard is hard to type on fluidly as there's no feedback while you're typing.

Unlike upcoming Android phones the HTC Hero and the Motorola Clique, there isn't much by way of customisation in the Galaxy Icon's software. It uses the standard homescreen that you can populate with shortcuts, widgets and photo speed dials, and it eschews extras like Microsoft Exchange email and support for Office files (although both can be added using downloaded software from Android Market). Google services are well-represented, with mobile-optimised versions of YouTube, Gmail, Calendar, Maps, Talk and the Chrome web browser. The screen doesn't support multi-touch gestures, but otherwise, the browser comes as close as we've seen yet to the iPhone's Safari.

Multimedia support is fairly basic — the hardware side holds up well thanks to the 3.5mm headphone jack, 8GB flash drive and loud external speaker, but music is limited to MP3s only, while the video player is limited to MPEG-4 and H.263 formats. Battery life is another area that could do with some improvements — with consistent use throughout the day, it barely made it through a 24-hour period.

Jenneth Orantia

6/10 Navman MY50T

It's packed with features, but you'll have to find them.

Navman
www.navman.com.au
$399

Online points of interest; large display; lifetime traffic subscription. ✔

Interface; clunky Bluetooth; inaccurate safety alerts. ✖

SPECIAL FEATURES
2009 Navteq maps
4.7in widescreen
Premium look and feel

Almost every phone we review nowadays comes with built-in GPS, so the feature itself isn't much of a showstopper. Portable navigation vendors have had to go out of their way to distinguish their offerings with extra value-add features, and Navman's new MY range gives a compelling argument as to why a dedicated in-car solution is the better option.

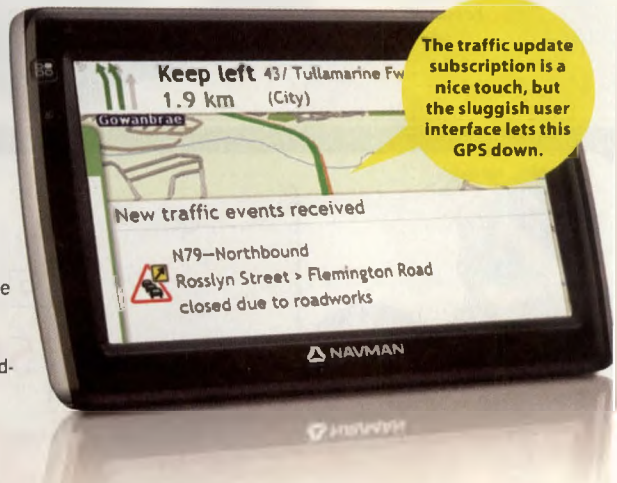
The MY50T is one of the mid-range models, but the extra-large 4.7in widescreen touch display and sleek 14mm depth gives it more of a premium look and feel. In addition to turn-by-turn mapping with the latest 2009 Navteq Australia-wide maps, the MY50T offers a lifetime SUNA live traffic subscription, preloaded safety alerts, and the ability to look up online points of interest using Google Search.

The MY50T is devoid of buttons save for the main menu button in the top left corner and a power slider on the top. The menu system uses large touch-friendly buttons, but overall we found the user interface difficult to use — it felt sluggish, and straightforward tasks like adding a waypoint to the journey seemed overly complicated.

The live data search with Google is a handy feature that connects to the internet through your mobile over Bluetooth, but it doesn't work with every phone. The MY50T connected with our iPhone 3GS, but hitting the Google Local Search button didn't do anything. We could run it with a Nokia, but the unit displayed an internet connection warning every time we used the Google Local Search feature, with no option to disable the warning.

As for navigation, the MY50T does a good-enough job, but it's not as accurate as we'd like. Speed limits were frequently incorrect, and it would warn us of school zones that weren't there. Re-routing when you've missed a turn is relatively slow, but unlike many other GPS devices we've tried recently, it will actually provide an alternate route rather than just tell you to do a U-Turn.

Jenneth Orantia



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GARMIN

[1] Source: Canalys research, total PND units sold worldwide Jan 07-Jun 09. [2] Conditions apply. See www.garmin.com.au for full Terms & Conditions. [3] With City Navigator 2010 map update.

9/10

Antec Two Hundred

Costs less than its name.

Altech
www.altech.com.au
$99

Inexpensive; plenty of extras.

No front fans; plain interior.

SPECIAL FEATURES
140mm exhaust fan
Six 3.5in bays

Sitting at the top of the gaming series of cases from Antec is the Twelve Hundred, priced at $300. Shipped without a power supply, it's not cheap. Move one step down to the Nine Hundred and you can save $100, but the simple fact is that triple-digit case prices scare some people. Fortunately, Antec has expanded its gaming series, and the good news is: it hasn't added a more expensive model — instead we see a new $99 model named the Two Hundred.

Coming in as a midi tower, the new Two Hundred does lack the presence of its big brothers. With that said, though, we see that Antec has added its own flair to the budget model to make sure it stands out. Front on we have two USB 2.0 ports along with audio jacks, moving down we have three 5.25in bays while below that we have a 3.5in hot-swappable e-SATA bay. The rest of the front is taken up with a spider-web-like design, behind which two 120mm fans can be installed.

Fortunately Antec hasn't left us without the ability to move air around the case. On the left panel we have room for another 120mm fan; at the top is a 140mm fan that helps push the hot air that rises inside the case; while the rear of the case sports a 120mm fan.

Inside is where you begin to see how money has been saved — it's a pretty standard steel setup that doesn't have a whole lot going for it in the looks department. While that might be true, there's plenty of room to build in: we've got six 3.5in bays, ATX support, cable management guides and many other Antec extras we've grown to love.

If you like the Two Hundred look and you're in the market for a case that falls under the $100 mark, this is a great option. While it lacks some of the extras that cases like the Nine and Twelve Hundred have, considering it's half to a third of the price it still has plenty to offer.

Shane Baxtor

Meet the little brother. He's not as fancy as the big guys, but still offers a great case for your gear.

9/10

Corsair HX750W PSU

Plenty of power from the masters of memory.

Corsair
www.corsair.com
$265

Great range; plenty of cables; good performance; 7-year warranty.

Expensive, though justifiable.

SPECIAL FEATURES
Single-rail design
Modular and fixed cables
7-year local warranty

Quality power supplies can be few and far between. There's really more to a PSU than a number that's stamped before that big W for watts. We've got rails and amperage we need to look at along with features like connectivity and cooling — all these aspects are what help make or break it.

When it comes to Corsair power supplies the thing you hope for is that its eye for detail and top performance in the memory world has translated to the PSU range. Out of the box, the black-and-blue design isn't as loud as other models but doesn't look plain either — a semi-modular design lets us know that the core cables aren't interrupted by extra connectivity.

Hardwired into the power supply are important connectors that include the 20+4 and 4+4 Pin connectors that go directly into your motherboard. We also have two 6+2 connectors that are required for most high-performance graphics cards. In modular form we have two more additional 6+2 PCI-E connectors, eight 4-Pin peripherals, two floppy and 12 SATA connectors.

Running our high-load GTX 285 SLI setup the system ran absolutely beautifully, with noise levels on the XH750 being quite low. Something interesting about the HX750 is the company's decision to include a single 62A +12V rail: this is something that's reserved for higher-quality units and, while it does add to the price, it helps cement the unit into a better league.

Recommending a power supply from Corsair, a company which has dominated the market with high-performance memory, still feels a little weird, but the bottom line is that the HX series of units offer excellent performance at a price that can be justified. Starting at 450W and going to 1,000W, there's a Corsair PSU in your price range. The 750W unit offers us a bit more power over the popular 620W model without the significant price jump that the 850W and 1,000W models carry. If all the above wasn't enough to convince you to buy the HX750W, the fact that the 7-year warranty is also available down under should seal the deal.

Shane Baxtor

8/10

Axim MR108-N

The Web 2.0-style configuration interface is just the beginning.

PC Range
www.pcrange.com.au
$259

Good price; slick user interface; 802.11n Wi-Fi.

Cross-browser compatibility problems in config interface.

SPECIAL FEATURES
3G sharing with good support
"Web 2.0"-style user interface
802.11n wireless

APC MAGAZINE HIGHLY RECOMMENDED

Aside from the noticeably better user interface than most other routers, Axim's range has strong features for people who use P2P a lot. A "fast recycling session manager" allows up to 20,000 incoming connections without the router's performance suffering, according to the manufacturer. This is claimed to be 10 times better than the average home router, and Axim says it allows traffic running through NAT to reach 95Mbit/s.

The Axim MR108-N has standard Ethernet and PPPoE support (for ADSL and cable) but also a USB port for 3G modem sharing, with excellent support for the modems sold by Australian telcos. We tested an Optus-supplied Huawei E1762, which worked fine (using the modem's generic Huawei modem support), as well as an older Telstra-provided Sierra Wireless 880E, and a current-release Sierra Wireless USB 306. Support for the latter modem is impressive because it is Telstra's 21Mbit/s model, which is too fast for the standard dial-up interface used by most wireless broadband modems, so Axim had to build support for the new direct network interface used by these kinds of modems.

For people who don't need 3G, a $20 cheaper model is available, which also adds features not found in the MR-108N, including an inbuilt BitTorrent client (using a USB hard drive for storage) and the ability to act as an FTP server (again, for files on a USB hard drive).

These two features are found on the P2P-focused PGP-108N, however we tested the MR-108N, which is focused on 3G modem sharing.

Although it was difficult to assess how well the fast recycling NAT server worked in the modem, due to the constantly varying performance of P2P downloads, the 3G connectivity aspect of the router worked very well, and performance was identical to using the USB modem plugged directly into a notebook. The router's interface had some glitches in Safari due to its interactive Javascript-centric pages, but worked fine in Firefox, which should keep users of all operating systems happy.

Dan Warne

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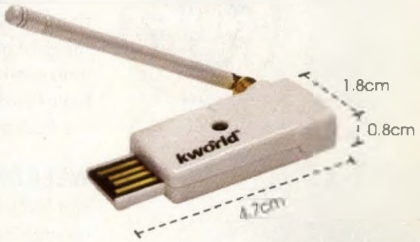

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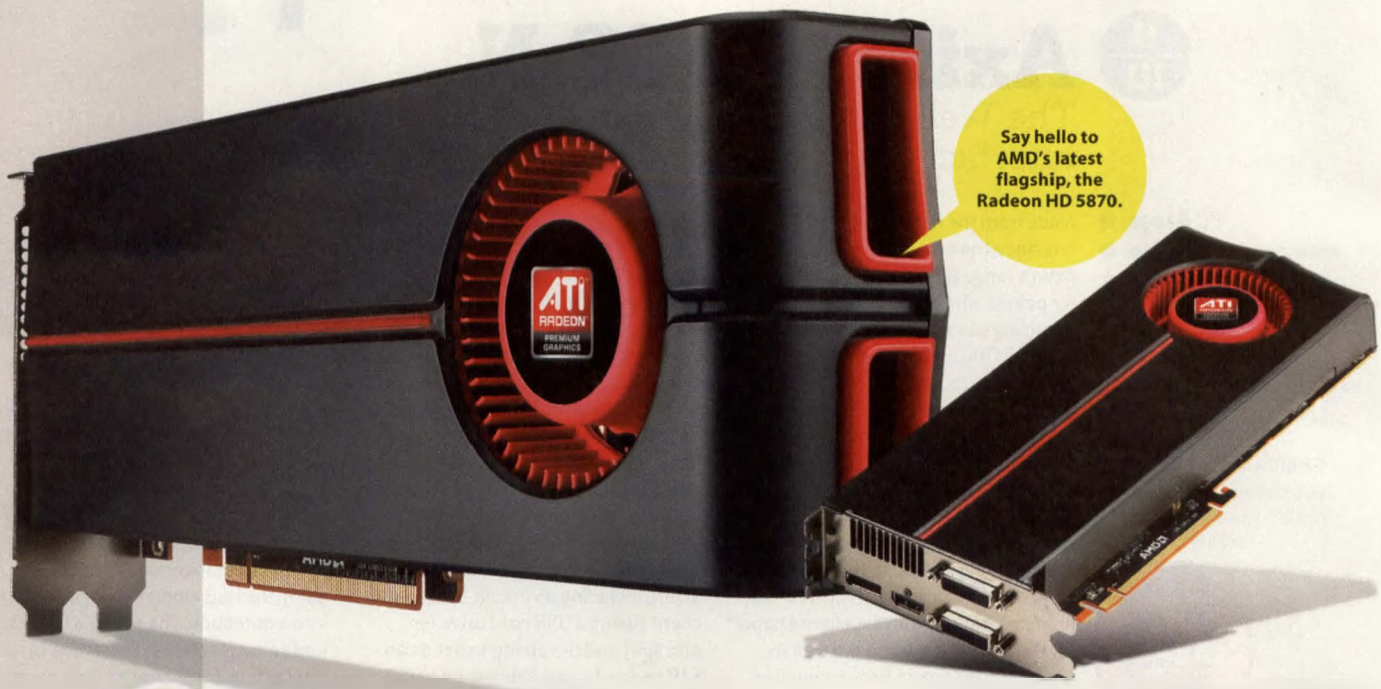


8/10

AMD Radeon HD 5800

The graphics card battle heats up and cools down.

AMD
www.amd.com
Around $550

Extremely fast performance; lower power requirements; lower heat output; relatively affordable for such speeds.

Still not as fast as the existing dual GPU cards; not as quiet as expected; Eyefinity feels like a gimmick.

SPECIAL FEATURES
Eyefinity multi-monitor support
DirectX 11
Cypress GPU (RV870)

Today's high-end video cards offer extreme performance but at an extreme price. To reach the tremendous speeds offered by the 4870x2 and GTX 295, both AMD and Nvidia packed two GPUs onto each card, leading to case-melting temperatures and tremendous PSU demands. Dual GPU cards also led to a plethora of compatibility issues, with many games running slowly, if at all.

Thankfully we now have a single GPU solution that offers frame rates in the same region as the dual GPU behemoths. Due to its single chip nature, this card runs significantly cooler and doesn't require a small nuclear reactor to churn through your games. Compatibility issues are also a thing of the past. The cherry on top is a range of new features, some of which *may even be useful*. The card? Say hello to AMD's latest flagship product, the Radeon HD 5870.

WELCOME TO CYPRESS

The 5870 is based on the first chip to emerge from AMD's new Evergreen family of GPUs, and at its heart beats the Cypress GPU (known internally at AMD as the RV870). Fabricated by TSMC, the Cypress is an evolution of ATI's RV770 chip, which powered the Radeon 4870. The new Cypress chip borrows heavily from the RV770 architecture but provides a massive performance increase using a rather brute force approach — it basically doubles all of the major components of the RV770. As a result, even though the manufacturing process has shrunk from 55 nanometres down to 40 nanometres, the die size has grown from 263 square millimetres up to 334 square millimetres.

This doubling is focused on the GPU's SIMDs, the cylinders that provide the power in the RV870 engine. Each SIMD is comprised of 16 Streaming processors, texture units, L1 cache, shared memory and controlling logic. The number of SIMDs has doubled from 10 in the RV770 up to 20 in the RV870. As a result, all of the other major components involved in performance have also doubled. Shader processers? Increased from 800 to 1600. Texture units? Also doubled, with 80 included in the RV870.

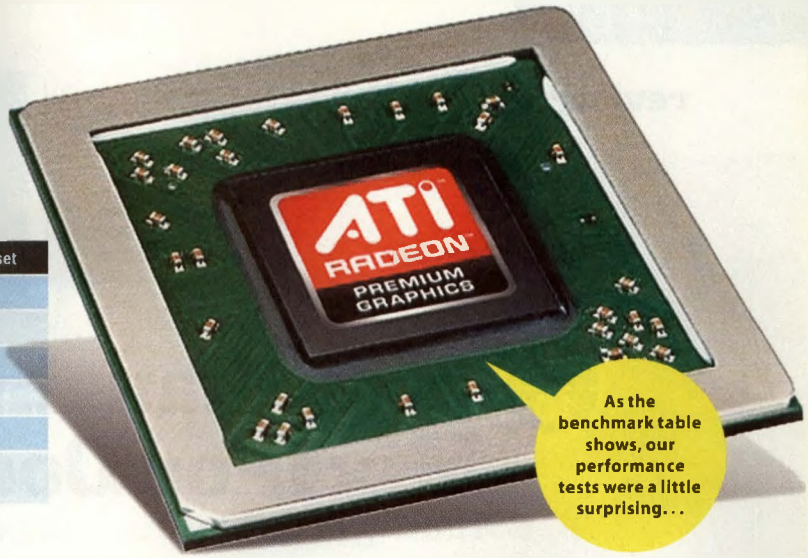
All of this doubling of components has had a massive impact on the transistor count of the card, growing from 956 million in the RV770, up to 2.15 billion in the Cypress. Yes, we did just say 2.15 billion. It's actually slightly more than double the number of transistors, with another 215 million devoted to a few new features. DirectX 11 support requires the inclusion of new operations, such as bit count, insert and extract, and other areas of the chip have been refined from multi-cycle computations down to single count computations. In other words, what used to take several passes now takes one.

Video users will be most interested in the addition of the Sum of Absolute Differences (SAD) instruction, which is used extensively in video encoding. The RV770 lacked support for this instruction, instead requiring emulation that took a whopping twelve other instructions. By now offering SAD in one instruction, AMD claims that encoding speeds will more than double on the RV870.

Running at a default speed of 850MHz, the Cypress GPU delivers a compute performance of 2.72 TFLOPs — according to AMD's marketing material, this equates to 177 IBM Deep Blue Supercomputers, the computer that beat Kasparov back in 1997. A

3DMARK VANTAGE RESULTS

GRAPHICS CARD	Extreme preset	Performance preset
Galaxy GTX 295 Overclocked	10,524	24,673
ASUS GTX 285 1GB Matrix	6,144	15,036
HIS HD 4890 iCooler x4 1GB	4,865	11,956
Sapphire HD 5870 1GB	8,301	17,597
Gigabyte HD 5850 1GB	6,687	14,873
Sapphire HD 5870 1GB Crossfire (two cards)	13,792	23,924



As the benchmark table shows, our performance tests were a little surprising...

gigabyte of DDR5 memory running at 1,200MHz provides a staggering 153.5GB/s of bandwidth, allowing this card to shrug off insanely high resolutions with ease.

MORE THAN JUST BLAZING PERFORMANCE

All of this hardware offers retina-scorching performance, as well as a few key features over and above raw frame rates. The Radeon 5870 is the world's first fully DirectX 11-compliant card, which couldn't have come at a better time for the marketing folk at AMD. You see, there's a rather exciting operating system by the name of Windows 7 on the way, and it too supports DirectX 11. Sadly the number of games supporting this API can be counted on a single hand... of a clumsy butcher.

If DirectX 11 is anything like prior versions, it's going to be *at least two years* before it's actually necessary. Interestingly, it's the first version of DirectX to support tessellation, a method of increasing detail in wireframes that ATI has been pushing for almost a decade.

Eyefinity is AMD's answer to the TripleHead multi-monitor support that Matrox has had for years. But Eyefinity goes one better, offering a maximum of six displays per video card. To have all six, you'll need the Eyefinity version of the card though; the standard 5870 has three outputs — two DVI/HDMI ports and a single DisplayPort. We've seen the six-monitor version in action, and had to ask ourselves — wouldn't it be simpler, and cheaper, to just buy a single large display? It's also not the best solution for gamers, with the screen bezel cutting off key areas of the display. We can see its benefit for productivity focused uses, such as tracking shares or 3D visualisation, but this card is far too overpowered for such uses.

HTPC users will love the HDMI audio support of the 5870. This card finally offers native support for 8-channel LPCM over HDMI. This is necessary for the high-end audio codecs of Blu-ray, and has been lacking in other HDMI cards until now. The 5870 also includes ATI's Universal Video Decoder, offering hardware acceleration of H.264, MPEG-2 and VC1, and can even accelerate two 1080p streams concurrently.

The final major feature is the inclusion of OpenCL, AMD's answer to Nvidia's CUDA. Unlike CUDA, OpenCL is an open format, whereas CUDA is a proprietary Nvidia-controlled format. However, they've both got one thing in common — extremely limited software support so far.

SCREAMING SINGLE-GPU PERFORMANCE

On paper, all of this hardware looks very impressive, but it takes real benchmarks to impress the *APC* team. We put the 5870 through its paces, as well as the new 5850. The 5850 is a cut-down version of the 5870, with a slightly slower GPU (725MHz), memory speed (1,000MHz) and fewer SIMDs. We also tested the 5870 against the Galaxy GTX 295, an overclocked version of the current dual-GPU king of the hill.

As the benchmark graphs show, our performance tests were a little surprising. Out of 17 different benchmarks, the 5870 only had the lead in five of the tests. The GTX 295 outperformed it in 11 tests, with one test being a dead heat.

However, in many of the tests that the GTX 295 won, the 5870 wasn't too far behind and delivered extremely playable frame rates at ridiculously high graphics settings.

Considering it's a single GPU card, we expected the 5870 to win in the sound levels test — with a lower TDP of only 188W (versus the GTX 295's 289W), it should be a quieter card due to less cooling. This wasn't the case though, with the ATI just a single decibel quieter than the Nvidia card.

STILL, IT'S A SINGLE GPU...

Despite the fact that the GTX 295 outperforms the 5870, we'd still much rather have the 5870 in our gaming PC. AMD has delivered a very powerful card in the 5870, which sets a new benchmark for single GPU performance. A dual-GPU solution known as Hemlock is just around the corner, and we're confident it will wipe the floor with the GTX 295. With rumours that Nvidia's next major release is delayed until early 2010, the 5870 is the hottest (and yet coolest) video card to have in 2009.

Bennett Ring and Shane Baxtor

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Care to make a statement with your iPod dock? Look no further.

7/10

Altec Lansing Mix iPod Dock

Hardly portable, but pumps out the tunes.

Altec Lansing
www.alteclansing.com
$499

Multiple inputs; room-filling sound; AC and battery-powered.

Poor stereo separation; no mixing functionality.

SPECIAL FEATURES
30-hour battery life
iPod and FM radio support
Built-in equaliser

Reminiscent of an '80s boom box, the Altec Lansing Mix iPod Dock is described as a portable iPod Dock — although you would want to be fairly chunky yourself to carry this thing around. It certainly makes a statement, and subtlety is not it!

Like the boom boxes of the past, the Mix has two sizeable two-way speakers on the front with a decent-sized side-firing woofer. Carry handles on the front and side allow you to lug this unit around, and it runs a claimed 30 hours on 8 x D-sized batteries, so you can hip hop away from the mains.

The name Mix is a bit of misnomer, as the unit itself does not have any mixing facilities. Although, you can listen to music from either your iPod or iPhone, FM radio or one of two analogue input sources.

A remote allows you to control the Mix whilst you bust your moves, and the backlit LCD screen, which displays the tune, input or FM frequency, is bright enough to use outside. An "equaliser" function allows you to boost or cut bass or treble, but there is no control over individual frequency bands.

Cranked up to full volume, this thing is loud — with perhaps a slightly over-emphasised thumping bass and some clipping in the treble and mid-range. At more comfortable listening volumes, we found the sound to be well-balanced with good crossover, so that neither the bass nor treble was over the top. Stereo separation is poor because of the lack of separation between speakers, although we suspect the target market probably couldn't care less.

The Mix iPod Dock sounds better than most — but don't think you can hide this thing behind a vase.

David Neiger

8/10

Logitech Z523 speakers

Good sound for gamers' ears.

Logitech Australia
www.logitech.com
$199.95

Very good bass response; stylish.

No digital inputs; poor crossover.

SPECIAL FEATURES
6.5in sub
Desk-level headphone socket
Sleek design

APC MAGAZINE HIGHLY RECOMMENDED

The Z523 speaker system comprises two stylish satellite speakers and a large sub with a 6.5in (16cm) down-firing driver to really shake the room and make this system ideal for gamers or those who like their music to rock.

The satellites are around 150mm tall and are sleek enough to fit beside your monitor, even if desk space is tight. The subwoofer is a 250mm cube which is best left on the floor unless you really like your things to rattle.

There is a single 3.5mm stereo input cable connected to the right speaker, which plugs into most sound cards as well as an additional 3.5mm stereo jack and an auxiliary stereo RCA input on the subwoofer. It appears you can only use one input at a time, since there is no switch to control the input source and there is no digital input for DVD players or optical sound cards.

The controls, which are on the face of the right speaker, are minimal and allow you to adjust volume and bass. There is also a headphone socket on the right speaker (which can be used at night or if the neighbours complain).

For relatively small speakers, the Z523 system certainly can fill a room with sound. Bass is very strong indeed. Treble response was adequate, although you would not want to set the volume too high — because distortion and sibilance were readily apparent, even at moderate settings.

Overall, you are purchasing computer speakers, not hi-fi audio components, and, as computer speakers, the Z523 system delivers better sound than most. We found the bass could easily be overpowering, but that may be exactly what you are looking for when gaming.

David Neiger

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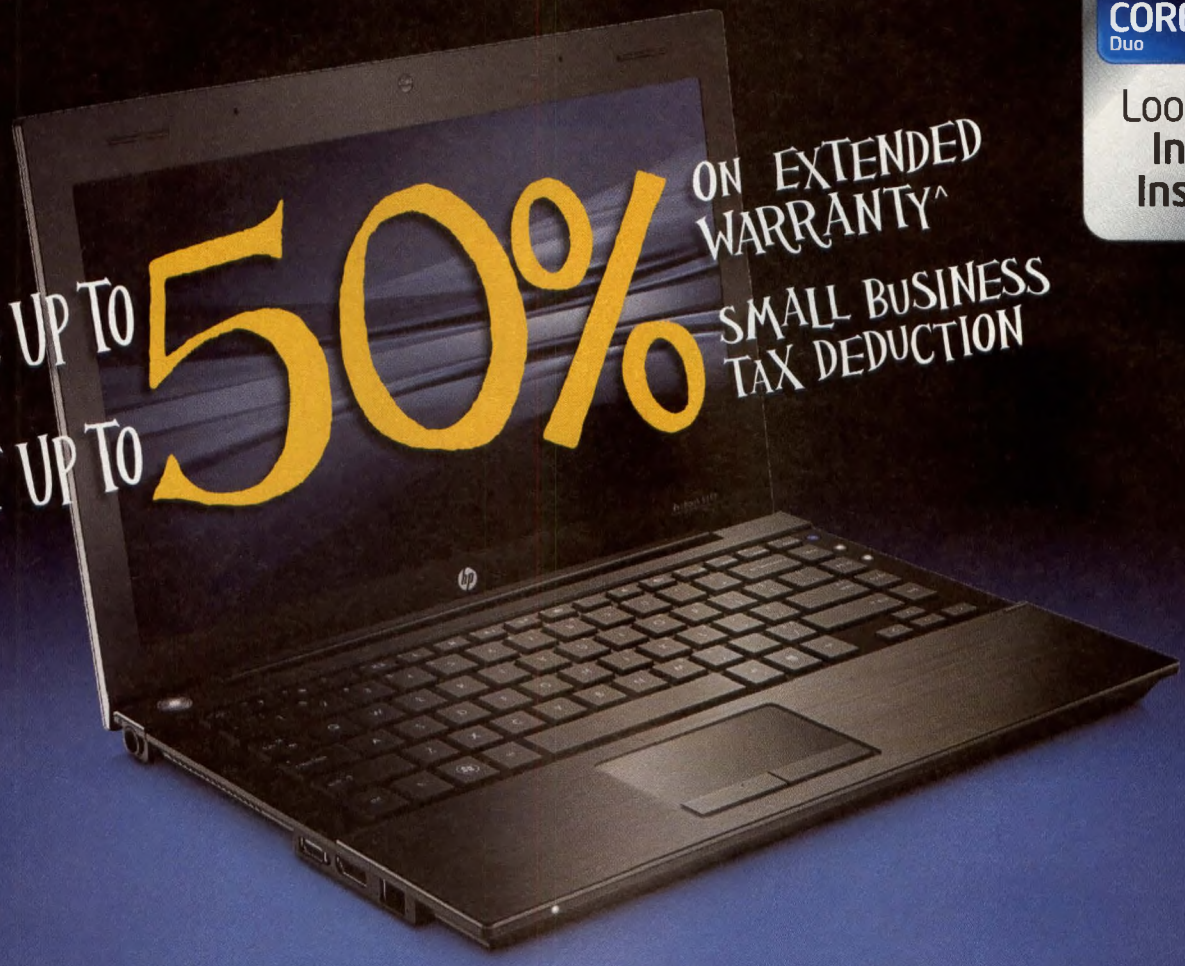

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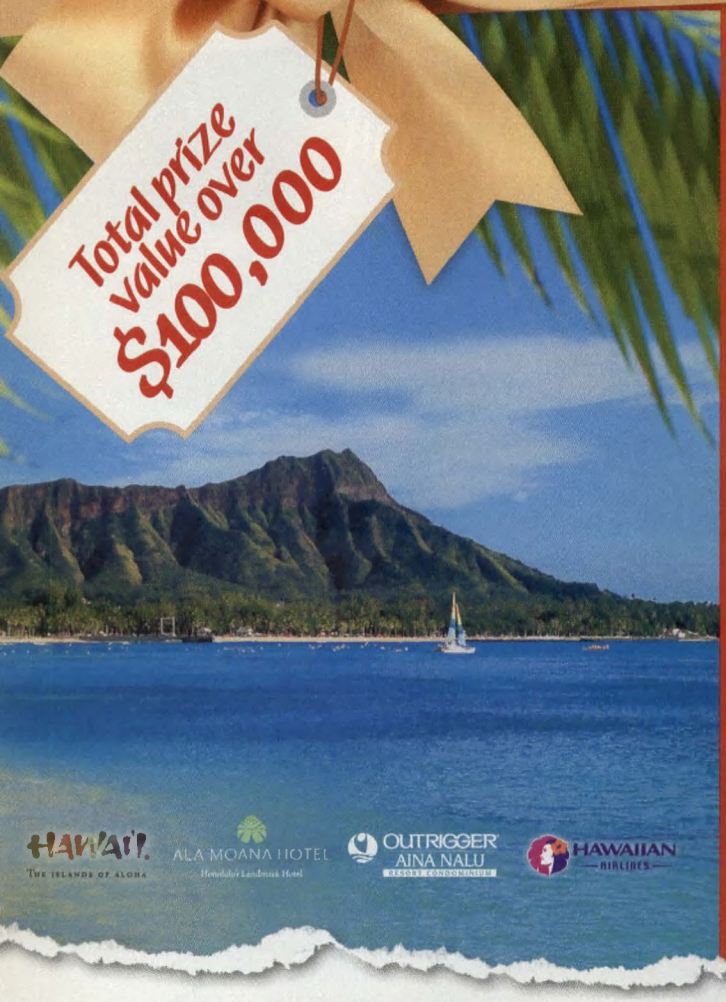

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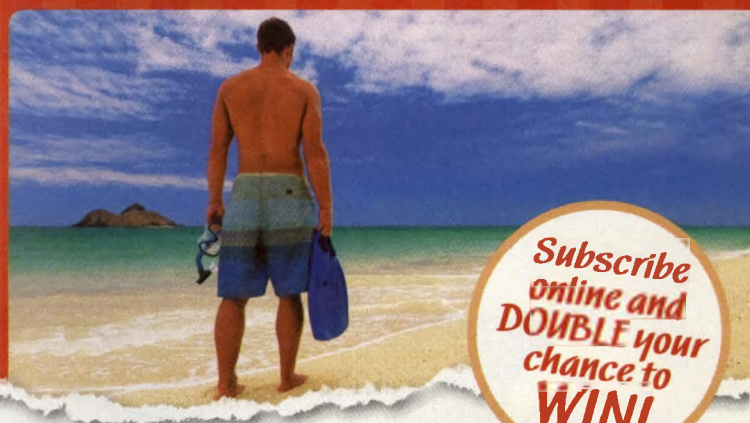

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9/10

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APC MAGAZINE apc EDITOR'S CHOICE

Sony presents its new 22in 720p S5700 series as the perfect choice for the second TV in your home. The company's research suggests that the average household contains '2.2' TVs, with secondary sets commonly appearing in bedrooms and kitchens. With most companies focusing on getting bigger, better and cheaper, it makes sense to offer a high-quality model for such rooms.

Most small TVs are designed to be cheap, and their quality tends to match. But the S5700 uses Sony's superb Bravia 3 image-processing engine and it shows. When watching HD TV, colours look natural, motion is silky smooth and detail superb. There were no issues with jaggies and panning shots and fast motion suffered no judder. We've simply not seen quality like this on such a small screen before, so it really stands out.

Sony's SD upscaling is the best we've seen on large, Full HD TVs, and it works brilliantly on the small screen. It's noticeably softer than HD broadcasts but jaggies are virtually absent and the image looks great. Even low-resolution news broadcasts looked good, with all jaggies on objects and people being replaced by smooth (if soft) lines. Scrolling text looked great too.

With a screen this size, you can also get away with watching analogue TV. Although Sony's image enhancements can't deal with 'weak analogue signal aberrations', it still looks excellent when the signal is strong enough.

It passed our Guitar Hero HD TV lag test — there wasn't any when we set it to game mode. It waltzed through all of our HQV quality benchmarks showing itself to be good at noise reduction, deinterlacing and jaggie removal. Much of this is moot when watching a 22in screen from a distance, but it's technically impressive nonetheless and helps round out the overall image quality. Watching movies at 1080/24p was also good — although it can't benefit from the Full HD resolution, the excellent downscaling meant that shimmering and juddering were virtually absent.

Contrast isn't stated. Instead, we're given another Sony brand name: advance contrast enhancer. Whatever it's called, we were impressed. Blacks looked black and detail remained present in dark and light areas.

Sound comes from two 5-watt speakers and gets loud while remaining rounded and crisp. The remote doesn't look easy to use at a glance, but most settings are accessible by pressing the big 'Home' button which brings up the PS3-like XrossMediaBar menu system, which provides easy access to all of the features. And there are many.

A USB slot means you can play back pictures. A DLNA-enabled network port lets you play media from most places on your home network. Connectivity is good with two HDMI ports, two composite, an S-Video, two component ports and a VGA socket. You can also connect external speakers via digital and coaxial SPDIF. The ambient light sensor is useful when watching in your bedroom and means you don't have to reduce the brightness manually when in a dark room. Finally, there's a clock on the front, which highlights its bedroom/kitchen designation.

The S5700 comes in four colours: silver, green, pink and brown to make an already stylish TV look that bit more funky. We really wouldn't have said that it's worth spending money on a secondary small TV, especially this much money, but the S5700 blew us away. We really want one. The superb quality is a step up from everything else on the market and this would be our first choice when looking for a secondary small TV. You have to pay for it, obviously. But frankly, it's worth the money.

Nick Ross

This new Bravia makes viewing great, it's a shame it can't fix the movie plot.

9/10

Ricoh GR Digital III

Plain Jane can fly you further.

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Design is (mostly) superb. ✔

The flimsy, fairy-floss flash hinge; tad expensive for first-time buyer. ✖

SPECIAL FEATURES *i*
10 megapixel
4x optical zoom
Video-recording feature

APC MAGAZINE apc EDITOR'S CHOICE

I can normally pick an angle on a new camera to use as a lead-in to the specs and good 'n' bad bits. It might be a new feature, glaring omission, ridiculous price, or a super-duper good manual. But with the Ricoh GR Digital III I could think of absolutely nothing snappy as a lead-in statement. Not that there is anything bad about this camera, nor is there anything glaringly good.

What it is though, is a good, solid camera without pretentions. It doesn't try and convince you it's all pink and girlie and for a designer handbag — mainly as it's black and a little bit boofy in shape. Nor does it try to look like a big macho, pseudo SLR either.

There are no controls with stupid icons that you scratch your head over before diving into the manual (which is 160+ pages of paper goodness) or search for five days in a row to find the flap hiding the USB port.

No, this camera is simply an enigma. It's a camera! Not a clock radio that takes pictures, nor can it act as a timer for a nuclear weapon, be designed to keep babies amused or double up as a compass, FM radio or GPS.

It has a 10MP-capable image sensor, and a 35mm equivalent 28mm lens, which is wide but not too wide (or not wide enough). Zoom is 4x standard and 5.7x digital — but who cares about digital anyway? Shutter speeds are from 1 sec to 1/2000th, and you can select auto-shooting, aperture or shutter priority, fully manual, or one of five "scene" settings. Image size settings are plentiful too ranging from 3,648 x 2,736 ie, huge, down to a more manageable internet friendly 640 x 480. If you are one of the growing number who uses the video camera mode of these types of camera, you'll be happy with 640 x 480 or 320 x 240, which is again, designed more for YouTube and web streaming than that flashy plasma in the corner, trust me.

The camera is powered by a rechargeable battery with its own cradle, ie. no in-camera charging, or at a pinch, you can use a couple of AAA alkaline batteries. Ricoh claims the rechargeable is good for 370 photos. From experience, the AAAs are for a pure emergency only.

At highest resolution, each image being around 19MB in size, the inbuilt 88MB is not going to go far; I'd suggest bunging a large SDHC card in the slot — around 4GB should do it for most as that will allow a bucketload of shots.

If you have used any previous compact camera, the controls on the GR III won't faze you either; they will be exactly the same. I tell you, this is weird, as this camera stands alone as a workhorse, but is the same as every other camera out there. Sheer genius on the Ricoh engineer's behalf if you ask me.

There is one niggle, as mentioned, though. I suspect at the last production meeting someone said 'Ah, we forgot something' — and therefore this is a bit flappy and flimsy. The flash. It sits atop the camera and swings up on a hinge after pressing a button on the side. Did I say flimsy? Well, yes I did. I suspect even the slightest sneeze from a butterfly at 10 paces would snap it off. Shame. Maybe Ricoh just hopes all shots will be taken outside. Hopefully the GR IV will fix it.

David Hague

It looks like a workhorse because it is. Just be careful with the flash.

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HYPER DRIVES

With better support from Win 7, Solid State Drives remove the last big PC speed bottleneck. **Bennett Ring** looks at today's SSDs.

UNDER REVIEW

Corsair X128 SSD | G.Skill Falcon 128GB | Intel X-25M 128GB | Kingston 64GB M Series | Kingston 128GB V Series | Patriot Torqx 128GB

To most people, the lowly hard drive occupies the bottom rungs of the PC performance ladder. To improve the speed of a PC, first thoughts are to splash out on an expensive new CPU, install large slabs of cutting-edge memory or, in the case of gamers, purchase a video card with enough grunt to render the latest Pixar film. Yet there's a new breed of hard drive that can improve a PC's responsiveness more than all of these components combined. Meet the solid state drive (SSD).

SSDs aren't exactly new; they've simply taken their sweet time to hit the mainstream. SSDs have been around in one form or another since the '50s, but were very different creatures to the 2.5in models now available from your local IT reseller. Typically used in supercomputers, their bank-busting cost prevented these drives from becoming everyday items.

In the mid '90s, the SSD's ability to handle extreme conditions made it perfect for military and aerospace deployment. A lack of moving parts within an SSD allows them to withstand the punishing g-forces found in aggressive fighter manoeuvres, and they're still found in most of today's military aircraft.

Due to their reliance upon large amounts of solid state memory, it wasn't until the massive price drops of recent years that SSDs were finally affordable for use within the PC. Combine these plummeting memory prices with a maturation of SSD technology, and SSDs were finally on the verge of widespread adoption. However, the first generation of consumer SSDs were plagued with a raft of problems. Despite their supposed improved reliability thanks to a lack of moving parts, the first generation of SSDs were as likely to stop working in the first few hours as they were to give you perfect service for the next few years. Then somebody noticed that the more you used an SSD, the slower they became. Worst of all, certain SSDs performed worse than our reliable HDDs — even when they were fresh out of the wrapping. When combined with their exponential price increase over mechanical drives, many questioned whether SSDs were ready for their debut in the home.

Thankfully, we're well and truly into the second generation of the consumer SSD. Most manufacturers claim to have addressed the issues that plagued their first round of drives. Let's see whether these claims stack up, but first we need to take a closer look at the problems that SSD manufacturers have had to deal with.

1 ANATOMY OF A HARD DRIVE

Let's take a quick refresher on today's hard disk drives (HDD), also referred to as mechanical drives. By knowing how a HDD operates compared to an SSD, it's much easier to understand why SSDs have so many benefits… not to mention a few less desirable traits.

In many ways, HDDs operate much like record players, in that they're both rotational media. This is a gross simplification that will make hardware engineers foam at the mouth, but for the layperson the principles are very similar.

Within the average HDD case are multiple magnetic disks called platters (the "records"). Data is written and read to these platters across tracks (concentric circles) and sectors (a pie-shaped wedge on a track). These platters spin at extremely high speeds, exceeding 10,000rpm in faster drives.

Just like the arm and needle found on a turntable, a HDD has a mechanical arm (called an actuator arm), but it has several heads attached to it instead of a single needle. To read or write information on one part of a platter, the arm must be moved into position, so these heads can access the relevant tracks or sectors. It's just like choosing an individual song on a record, where the needle must be lifted off the record, then repositioned over the correct groove of the record. But the arm in a hard drive moves

significantly faster than the old record player, at more than 50 times per second. The hard drive also contains a logic board that contains all of the necessary electronics to read and write to the platters. As you can see, there are a lot of moving parts in a mechanical hard drive.

2 A VERY DIFFERENT CREATURE

An SSD is a very different creature indeed. Instead of using spinning platters to store data, an SSD uses NAND-flash memory. It's the same kind of memory you'll see in a $5 USB memory stick and is significantly slower than the DRAM used in your PC. Yet it's much cheaper than DRAM, making flash-based SSDs much less expensive than DRAM-based SSDs. If money isn't an obstacle, it's possible to buy a DRAM-based SSD, but for the purposes of this article we're sticking to the more popular flash-based drives.

The NAND-flash memory inside these SSDs is built using N-channel MOSFETs, a type of transistor. One of these transistors is required for every cell of memory. Each cell stores one or two bits of data — if it stores a single bit it's called a Single Level Cell (SLC). If it stores two bits, it's referred to as a Multi Level Cell (MLC). Both of these types of cell are identically constructed and therefore cost the same. They only differ in the way in which they store data. Because it can store two bits instead of one, MLC has twice the capacity of SLC. This is why most of today's consumer SSDs use MLC, as it's much cheaper for a given amount of storage. However, MLC flash takes three times longer to write to than SLC, a by-product of the fact that it stores more information, yet it's still more than fast enough for the needs of an SSD. If you've got the cash, an SLC drive offers much faster write performance, but you'll pay for the privilege.

Regardless of whether MLC or SLC cells are used, these cells are the building block of the SSD and are arranged together into pages. The average page size in today's SSDs

TRIM

Most importantly — only buy a drive if it has TRIM support already or the manufacturer has committed to release TRIM support for the drive in the near future.

LATEST GENERATION

Don't buy one of the cheaper, first-generation drives — they've got too many issues.

SPACE

Check if your drive has hidden 'free space' — it's a good thing if it does.

SPEED

Remember that random read/write speeds are just as important, if not more so, than sequential read/writes.

WARRANTY

Ensure your chosen drive has a solid, reliable warranty.

What do I look for?

In a SSD Drive. . .

Don't shoot for the cheapest models, they are either very limited in capacity, first generation with performance issues, or just plain crap. If you consider only one thing buy a drive with TRIM support. It'll keep the drive running at top speed for its entire life.

WINDOWS 7 BOOST FOR SSD's

Unlike Vista, Windows 7 can spot the difference between a mechanical and SSD and seek to more efficiently partition the SSD, to minimise unnecessary read-write cycles. The disk defragmentation service is also disabled when Windows 7 detects installation on an SSD, as defrags shorten the lifespan of a solid state drive without improving its performance.

Defragmentation is intended to boost read times by ensuring that all data blocks in a single file remain together. But flash memory already has a high read rate, so the gains are negligible — but the process of shuffling the data around the SSD gradually wears out the drive due to the need to 'flash' each cell with a burst of high voltage.

Windows 7 also comes with a new TRIM feature that will cut down on the amount of data to be deleted (to further extend an SSD's lifespan) and delete garbage data in advance (to speed up the writing of data, which is the activity where SSDs are slowest). Windows 7 also uses particular ATA commands which further improve SSD write speeds. Microsoft also intends to launch a certification program for SSDs which give priority to reading data over slower data writes rather than treating both equally and use a native Serial ATA interface rather than Parallel ATA.

At this point, Windows 7 is unlikely to adopt the newer Non-Volatile Memory Host Controller Interface (NVMHCI) which has been designed specifically for SSDs. Intel created NVMHCI as part of its push into solid state technology and intends it to replace the ATA interface, which was developed for hard disk drives.

"It's too early to say if NVMHCI will make it into Windows 7" says Jeff Price, senior director of Windows product management. "The availability of NVMHCI hardware is still nascent".

Another SSD-centric focus for Microsoft is ensuring that Windows 7 can fit on the smaller solid state drives of netbooks. While most of today's SSD-equipped netbooks ship with a maximum 8GB drive, this is expected to double within the coming year. And it'll need to, because Windows 7 will lay claim to almost half of that space.

is 4KB. These 4KB pages are then combined to form blocks, with the most common arrangement being 128 pages per block, or 512KB.

It's very important to note the difference between a page and a block, because today's SSDs can read and write to a single page (4KB) at a time, but can only erase a block, which is usually 128 pages at a time. This difference between reading, writing and erasing is the key reason why the introduction of SSDs to the desktop hasn't gone smoothly, with several nasty problems caused by this issue.

The 512KB blocks are then grouped into planes, usually of 1,024 blocks each, which equals 512MB of storage. Each plane is a single NAND-flash die, and these in turn form part of a package or IC, usually containing one, two or four die. These packages are then combined with a controller to form the drive — with the average capacity for a medium level drive hovering between 64GB — 128GB.

3 TEAMWORK IS KEY

As mentioned before, the NAND-flash memory that consumer SSDs are based on is a relatively slow type of memory. However, an SSD gets its excellent speed by putting multiple ICs to work at once — it's not limited to accessing each IC one at a time. If one IC has a maximum read speed of 15MB/s, and the SSD can access ten of these at once, the maximum read speed of the drive becomes a whopping 150MB/s, minus a few per cent for overhead. This parallelism is key to an SSD's fantastic throughput. Because of this, today's fastest SSDs have sustained sequential read and write speeds averaging twice as fast as the best mechanical ATA drives.

An SSD can also access any of the pages very quickly, as it has no moving parts. Compare this to a mechanical drive, where the actuator arm needs to move, while the platter needs to spin, before it can do any reading or writing. This gives SSDs a tremendous theoretical advantage when it comes to random reading and writing speeds, as it doesn't need as long to move the arm to different spots on the platter. It's here that SSDs can really leave HDDs eating their silicon dust. In our HD Tach tests, the consumer SSDs accessed a random area of the disk in 0.1ms. The once speedy WD VelociRaptor took 7.4ms — that's 74 times longer than the SSD. This leads to SSDs having much faster theoretical read and write speeds to random areas.

We say theoretical for good reason though, and it all comes back to that pesky limitation that SSDs can only erase an entire block at a time, rather than each of the 128 pages that make up a block.

PROBLEM 1

SLOWING OVER TIME

When an SSD is fresh off the shelf, each page is empty, and they can be written over without any dramas. Performance is fast, and the computer user is one happy chappy. However, over time the drive starts to get filled with data, and most of the pages get written to. Even when the user deletes a file, the pages remain full — the OS just assumes the pages are empty.

Once a page is full, unlike a HDD, in an SSD it can't simply be overwritten — the drive must first erase the page before it can write to it again. Yet due to the previously mentioned limitation, to delete that one tiny 4KB page, the drive must delete an entire 512KB block. As you'd expect, it takes a lot longer to delete an entire block than a single page. Making matters worse, some of the other pages in that 512KB block probably don't need to be deleted, so the SSD also has to temporarily store those pages somewhere else, before rewriting both the old and new data. Instead of just writing to an empty page, it's a time-consuming process of reading, erasing and re-writing.

As the SSD gets older, it becomes filled with data, so this process of erasing a block for every write request becomes more commonplace. This problem plagued the first SSDs to hit the desktop in 2007. Copying a file between pages on an SSD was blazingly fast when it was fresh out of the box, but over time slowed to speeds that would embarrass an old 5,400rpm HDD, let alone the 10,000rpm speed freaks available today. Read speeds remained excellent, but reading is only one part of a hard drive's job. This issue still plagues today's SSDs, but there is a solution.

PROBLEM 2

SHORT SHELF LIFE

There's even more bad news for SSDs though. Each of the N-channel MOSFETs, the cells that store the bits within an SSD, can only be written to between 10,000 and 100,000 times. Any more than this and they stop being writeable; thankfully it's possible to still read data from them, making data recovery a breeze from an SSD. It used to be worse in older drives, which could only handle 1,000 erases before giving up the ghost.

Defrag is only necessary for standard hard-drives to save the drive arm from unneccesary over-use. Defragging can be damaging to SSDs.

THE END OF DEFRAG?

Most PC users are accustomed to the periodic ritual of a system defrag. Usually set to run at the witching hour, by sunrise the hard drive's mess of randomly written files have been nicely rearranged in a sequential arrangement. By doing so, the arm within a mechanical hard drive doesn't need to move so far when reading files, speeding up read times from the drive. For many users, the habit of defragging is as ingrained as the weekly virus scan. It's a habit that will need to be broken after the switch to an SSD.

SSDs don't need to store their data in one area of the drive. Due to their ability to access files across multiple areas of the disk very quickly, they actually work better when data is spread across different areas of the drive.

Defragging also potentially lessens the life of an SSD. An SSD stores its data on flash cells, and these have a limited lifespan, with some cells dying after a mere 10,000 erase cycles. Today's SSD include logic to ensure the "wear" on these cells is distributed evenly across all of the cells, so that this limit is never reached in the normal lifespan of the drive. But defragging requires every cell to be erased, causing unnecessary erase cycles on the flash cells.

Thankfully, OS creators are aware that defragging is a bad thing for SSDs. Windows 7 automatically detects whether a drive is SSD and disables defrag if one is detected. However, Vista and XP users will need to manually disable scheduled defrags on SSD drives.

PROBLEM 3

POOR LOGIC

Finally, early SSDs concentrated on higher bandwidth (how fast the drive can read and write large files) than the latency of the drives (how fast it can read and write smaller, random files). They were great at backing up a DVD to your drive, but the myriad of small I/O operations of an OS brought them to a stuttery halt.

So, over time these drives became slower than a mechanical drive, died faster and cost about ten times more. Why on Earth would anybody want to replace their trusty old HDDs with an SSD? Sure, they were blazingly fast in certain situations, but the pros seemed to outweigh the cons.

Thankfully, the majority of today's second generation consumer SSDs have rectified the issues that plagued the first generation. Let's start with the really scary problem first — failure over a short period of time.

SOLUTION 1

Today's drives contain logic that ensures data is spread evenly across the cells. At a minimum of ten thousand writes per cell, even in the unlikely event that you wrote to each cell once per day, it would still live for over 25 years. Yet there are certain types of files that are written to much more frequently than once per day, such as the file system log file. Today's SSDs ensure that these types of files are written to specialised high endurance cells, which can handle several million writes. The net result is that today's SSDs should easily match the three- to five-year lifespan of current hard drives, and because they have no moving parts can better handle the bumps and scrapes of a life on the road in a notebook.

Having said that, of the eight SSDs that we tested for this roundup, two malfunctioned within three hours of use. We don't think it's a fault of the fundamentals of SSD though — it's just that manufacturers are still getting used to building these drives, so failure rates are higher than other types of components.

If you're in the market for an SSD, it's extremely wise to ensure that alongside the blazing performance stickers on the box, there's another sticker promoting a lengthy warranty for hardware failure.

The issue of writes slowing down over time is a much trickier problem to solve. A manual fix was to do a secure erase of the drive, which unlike a format actually erases every single cell on the drive, returning the drive to a pristine condition. It's an effective fix, but is totally useless for those who want to run their OS off the SSD. Who wants to have to re-image their drive every other week, just because it keeps slowing down?

1 TRIM, TAUGHT AND TERRIFIC

The real solution to drives slowing down over time is the TRIM command. This requires both SSD and operating system support. Windows 7 will support TRIM natively, yet today's TRIM software can be run manually in XP and Vista. It's available right now, free of charge, in the form of a little application called wiper.exe. This is currently the only publicly available way to run TRIM on Windows.

Running wiper.exe takes around two minutes, after which the drive performs almost as good as new. Unfortunately, not all drives currently support it, as seen by the list below.

Intel X25-M	No
Patriot Torqx	Yes
G.Skill Falcon	Yes
Kingston 128GB V Series	No
Kingston 64GB M Series (Intel controller)	No
Corsair X128	Yes
Solidata K2	No

Note that Intel plans to release TRIM support for all of its drives in future, but we don't have a date for this.

TRIM seems to be quite simple in the way it works. It simply deletes the cells at the time of deletion. Without TRIM, a file delete leaves the cells with invalid data on them, which isn't a problem on mechanical HDDs — which can simply overwrite this invalid data. But on SSDs, these cells must be erased before being reused, leading to the delays we discussed earlier. However, by using TRIM, these cells are totally erased at the time of deletion. It takes a little longer to delete a file, but when the user goes to write to these pages in future, there's none of the read, delete, re-write shenanigans that early SSDs were troubled by.

It can also be run in the same way as a defrag — set it up to run every week across the entire drive and your drive will stay in tip-top shape. As mentioned before, it only takes around two minutes to run TRIM on a 128GB SSD.

HOW WE TESTED

We wanted to use a relatively speedy system to get the most out of these drives. Our testbench was comprised of:

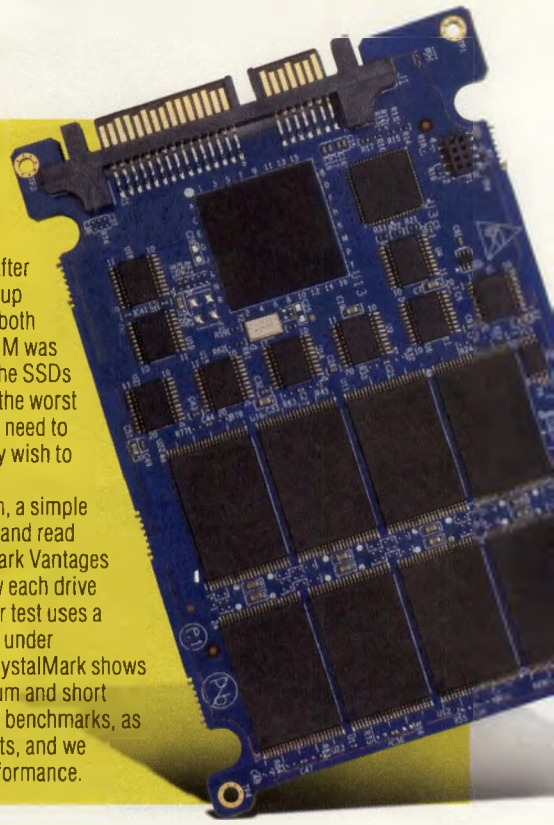
- **Intel i5 CPU at 2.97GHz**
- **4GB of DDR3-1600**
- **Nvidia GeForce 8800GT**
- **Windows 7 RC v7100**
- **Intel P55 motherboard**

Because these drives can degrade as they reach their capacity, we wanted to test them in the most realistic situation. A clean drive, fresh out of the box, is not how these drives are going to operate for the majority of their lives. Unfortunately, this is how most other reviewers test the drive, which is why they generally proclaim all SSDs as quicker than Speedy Gonzalez.

To replicate real-world use, we filled approximately 80% of each drive with random small files before doing a quick format (which doesn't actually erase each cell) and then re-imaging our Windows 7 install. All suppliers were asked to supply any TRIM software; we ended up using wiper.exe for all drives, as this was the only software supplied to *APC*.

It's here that things became interesting. Out of curiosity we benchmarked several drives before and after TRIM. The results were astounding, with up to a six-fold increase in performance for both random and sustained write results if TRIM was supported. It's no surprise that some of the SSDs with no TRIM support exhibited some of the worst performance. The makers of these drives need to urgently release TRIM applications if they wish to remain competitive.

Our benchmarks started with HD Tach, a simple benchmark that gives access times (ms) and read times (MB/s) for files. Next up was PCMark Vantages HD test, which gives an indication of how each drive performs relative to the rest. Our IO meter test uses a custom boot config file, to test the drives under theoretical OS conditions, while lastly CrystalMark shows how these drives perform for long, medium and short read and writes. We used a wide range of benchmarks, as some drives are optimised for certain tests, and we wanted an all-encompassing view of performance.



2 ST-ST-STUTTERING

There's still one slight problem — it doesn't fix performance when overwriting files. In this case, the drive must still read the data back, store it someplace else, erase the files, then re-write the new file. This is why it's recommended to never fill an SSD — do so and performance may plummet. By keeping free space, it always allows the system to write to clean cells, rather than overwriting existing cells. Many of today's SSDs already include "hidden" free space for this very reason, so that the drive is never completely full.

So now that the issue of degrading performance over time has been resolved for most drives, what about the problem of drives simply performing terribly when doing lots of random reads and writes? That too appears to have been solved, as the sole focus on bandwidth figures by manufacturers has been reduced, with random I/O performance now just as important. Updated drive controller logic takes into account that it must balance throughput with random access. As a result, today's SSDs shouldn't suffer from the same stutters and jitters that plagued the first generation.

It's all smelling pretty rosey for the SSD after its initial rocky start. The major problems have been cleared up, and prices continue to plummet. But just how fast are they, and in what situations will you notice the benefits of an SSD?

3 HOW FAST IS FAST?

Before we dig into the benchmarks, let's talk about our real-world impressions. Our test PC was the author's usual work machine, consisting of a quad-core Core 2 Duo, overclocked to 3.5GHz, and 4GB of DDR2-800, all plugged into a 780i SLI eVGA motherboard. A RADEON 4870x2 handled the visuals, while twin 10,000rpm VelociRaptor drives set up in RAID 0 (using the onboard Nvidia controller) were used for OS and application duties. Before installing an SSD, we were more than happy with the performance of this machine. The RAID 0 VelociRaptor setup allowed for quick file transfers, responsive application performance and relatively short boot-up times.

Or so we thought. After replacing the VelociRaptors with a single 128GB Patriot Torqx drive for OS and main application duties, the difference between the two setups was night and day.

Both Vista and Windows 7 booted and shut down much faster. On the SSD, opening applications felt near instantaneous, even while opening several at once. The responsiveness once an application was open was an order of magnitude better than with the mechanical drives. Whether it was opening files in Word, opening multiple applications at once while others were already open, or loading a level of Call of Duty 4, performance was significantly faster. Remember, we came from an already speedy setup — two VelociRaptors in RAID 0, and it still felt much better.

Copying between folders on the SSD was also much quicker, but it was the day-to-day use of Windows that was most noticeable. It felt as if we'd been given a brand-new PC that was easily double the performance of our HDD-equipped machine. Did we mention how fast the SSD machines booted?

Intel X25-M	31 Seconds
Western Digital VelociRaptor	47 Seconds
Western Digital 1TB Caviar Black	63 Seconds

In a world inhabited solely by Lotto winners, we'd replace all of the drives in our machines with an SSD, but in the real world the cost is still prohibitive. So use your SSD where it's going to make the most difference — as the drive for your operating system and most commonly used applications and games. Keep your mechanical drives for the important, if somewhat less glamorous, duty of storing your massive music, photo and video collections.

Bear in mind that if you're running an ancient PC, an SSD isn't going to magically solve the problems of your 486 CPU and 128MB of SDRAM. However, if you're running a 3GHz dual-core with at least 2GB of RAM, installing an SSD will have a much bigger impact on system performance than upgrading your CPU, memory or motherboard.

Installing an SSD couldn't be simpler — the OS recognises it as just another drive, so there's no need for special drivers. Simply plug it in to your nearest empty SATA port and away you go. And yes, you can even RAID them for stupidly fast performance, but you'll soon hit the ceiling of SATA's bandwidth. The only annoying thing when installing an SSD is that firmware updating requires the insertion of a small jumper on most drives. It's a quaint touch that is quite annoying in this day and age.

HD TACH QUICK = 8MB ZONES; LONG = 32MB ZONES

	Quick Random Access (ms)	Quick Average Read (MB/s)	Long Random Access (ms)	Long Average Read (MB/s)
Intel X25-M	0.1	238.1	0.1	234
Patriot Torqx	0.2	175	0.2	179
G.Skill Falcon	0.1	177	0.1	179
Kingston 128GB V Series	0.2	96	0.3	96
Kingston 64GB M Series (Intel controller)	0.1	196	0.1	195
Corsair X128	0.1	194	0.1	178
Western Digital VelociRaptor	7.4	106	7.1	104
Western Digital 1TB Caviar Black	12.7	92	14.3	92

PCMARK VANTAGE HDD

SSD Drive	Score
Intel X25-M	19,456
Patriot Torqx	17,752
G.Skill Falcon	18,544
Kingston 128GB V Series	8,399
Kingston 64GB M Series (Intel controller)	19,944
Corsair X128	20,043
Western Digital VelociRaptor	5,619
Western Digital 1TB Caviar Black	5,029

TRIM SUPPORT? WIPER.EXE

SSD Drive	Support
Intel X25-M	No
Patriot Torqx	Yes
G.Skill Falcon	Yes
Kingston 128GB V Series	No
Kingston 64GB M Series (Intel controller)	No
Corsair X128	Yes

IOMETER BOOT TEST

SSD Drives	Total I/Os per second	Total MB/s	Average I/O response time (ms)	Max I/O response time (ms)
Intel X25-M	2,085	85	31	461
Patriot Torqx	1,696	69	38	114
G.Skill Falcon	1,971	80	32	93
Kingston 128GB V Series	104	4	613	2,905
Kingston 64GB M Series (Intel controller)	2,070	84	31	90
Corsair X128	2,247	91	28	85
Western Digital VelociRaptor	346	14	185	973
Western Digital 1TB Caviar Black	245	10	261	698

CRYSTALMARK

CrystalMark	Seq. Read (MB/s)	Seq. Write (MB/s)	512k Read (MB/s)	512k Write (MB/s)	4k Read (MB/s)	4k Write (MB/s)
Intel X25-M	218	90	152	95	14	40
Patriot Torqx	208	129	141	112	16	9
G.Skill Falcon	214	143	144	126	16	12
Kingston 128GB V Series	110	81	106	55	12	2
Kingston 64GB M Series (Intel controller)	226	79	150	78	13	42
Corsair X128	220	150	160	180	18	18
Western Digital VelociRaptor	124	123	59	82	1	3
Western Digital 1TB Caviar Black	118	108	59	96	1	2

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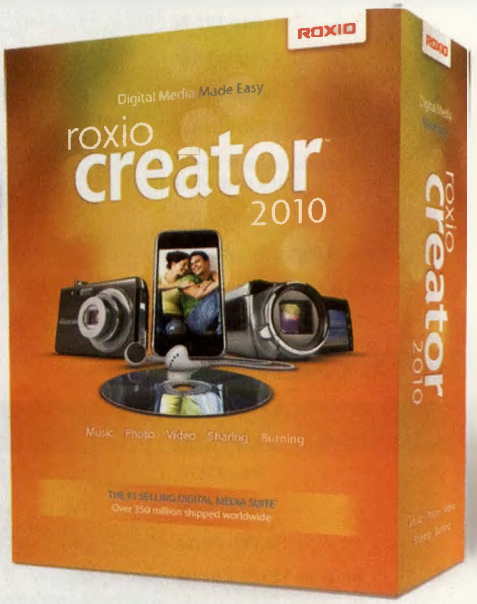
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SSD ROUNDUP

Corsair X128 SSD

@ www.corsair.com
✔ Depending on which benchmark, it's the fastest.
✖ Needs improvement for doing small writes.

Can Corsair's memory heritage help its SSD?

Thankfully, our benchmarks seem to indicate that Corsair carried over its experience with performance memory to create a high-performance SSD. The X128 is an extremely fast drive; according to PCMark Vantage's HDD test it's the fastest drive in our roundup.

Considering it's over $100 cheaper than the Intel drive, that's no mean feat. IOMeter also gave it a glowing rap, with this drive having the lowest maximum IO response time. This means that the drive doesn't get bogged down doing IO operations.

The only area where the Intel and Kingston drives bested this beast was in the area of small writes, with the Intel drives having almost twice the performance. This is arguably one of the most important measures for an SSD to be used for your OS, so we hope that Corsair can work on this area. But regardless of this one average result (which is still six times faster than the VelociRaptor), the X128 is an incredibly fast drive, and we highly recommend it.

G.Skill Falcon 128GB

@ www.gskill.com
✔ Above-average performance; almost affordable.
✖ Not quite the fastest of the pack.

Soaring performance with down-to-earth pricing.

There's a lot to like about this SSD. Performance is in the upper end of the spectrum, even in our arduous IO Meter test, which is designed to replicate the thousands of IO requests of an operating system at boot. This drive managed almost 2,000 I/Os per second, almost a six-fold increase over the zippy VelociRaptor.

Indeed, across all of our benchmarks, the Falcon placed in the upper half of the test results.

Yet it's one of the most affordable drives in the roundup — anything cheaper than this, and the old issues of the first generation start to rear their troublesome heads.

As a result, the Falcon is our pick for those on a budget but who still demand the ultimate in performance. It's even got a two-year warranty, which is a must if you're spending this much on a drive.

Highly recommended, especially considering it already supports the TRIM command.

Intel X-25M 128GB

@ www.intel.com
✔ Blazingly fast; excels at the small writes.
✖ Blazingly expensive; still no TRIM support.

An industry leader, the X-25M is still missing one crucial feature.

As one of the major players in the consumer SSD world, Intel has a lot to prove with its line of SSDs. After running this 128GB drive through the wringer, it appears Intel has achieved what it set out to do. This drive proved itself one of the fastest time and again.

You'll pay for this performance though, at around $650 for 128GB. Note that this price is an approximation based on current US pricing, as we couldn't find any local distributors currently carrying the 128GB X-25M at the time of printing. This astonishing price works out at $5 per gigabyte, around twice that of other drives that are almost as fast.

There's another issue with this drive — at the time of writing, there is no TRIM support. We spoke to Intel about this, and apparently it's on the way, but until then you'll need to do a secure erase to restore this drive to optimal performance. Still, the fact that it performed so well in our tests even without TRIM suggests this drive is capable of much more than we saw in our tests.

SSD ROUNDUP

Kingston 64GB M Series

@ www.kingston.com
✔ Blazing-fast performance.
✖ Overly expensive; small capacity; no TRIM.

It's a relief to see that not all Kingston drives are slow...

Performance for this drive was blazingly fast — the polar opposite of its much cheaper cousin. It recorded the fastest sequential read speed, and its 4k write speed was phenomenal — making it perfect for the smaller writes of an operating system.

Sadly, like the Intel drive, there's no TRIM support for this wannabe speed demon. We're sure its sequential write speed would be much more impressive if we could have cleaned out all those invalid pages before running our tests, but for whatever reason, both Intel and Kingston haven't released this software yet.

Another flaw of this SSD is the astronomical price, costing more than the recommended G.Skill drive, yet with only half the capacity. As a result, we're very hesitant to recommend this drive. Release TRIM support and drop $100 off the price and it'd be a very tempting piece of high-end equipment, but until then there are better drives for your money.

Kingston 128GB V Series

@ www.kingston.com
✔ As cheap as they come.
✖ Slower than an old HDD when it comes to writing.

Like the old saying says: You get what you pay for.

At less than half the price of a competing Intel drive, this is the cheapest-per-GB SSD that you can get. But what has Kingston had to sacrifice to get the price this low?

While we're unable to confirm whether it will be released in future, we can confirm that right now there is no TRIM support for this drive. As a result, performance over time is going to plummet, especially when it comes to random writes. Our benchmarks proved this, with our pre-used drive recording a maximum write time of 2.9 seconds in the IOMeter tests! Sustained read speeds were fine, leaving mechanical drives far behind, but we can't think of a single appropriate use for such an expensive drive if all it's going to do is read data. These drives are most suitable for OS and application use, yet with random write times approaching three seconds, the V Series stands for Very slow.

This drive could have a 50-year warranty, sell for $100 less and include a free flight to Tassie, and we still wouldn't recommend it.

Patriot Torqx 128GB

@ www.patriotmemory.com
✔ TRIM support; no stuttering; good performance.
✖ A little pricey.

Patriot's second-gen SSD shows how important TRIM support is.

The Torqx is a great example of the second generation of SSDs. Before using TRIM, it ran like a sloth on tranquilisers. Post-TRIM found this speed demon regaining its former glory. Performance left the HDDs spluttering in its wake, though it didn't quite reach the heights of the Intel or Corsair drive.

This is the drive we've been running in our OS for the last few weeks, and it has made us true believers in the value of an SSD. There's no stuttering, no crashes, no mess whatsoever.

It may not be the fastest on the block, but even with middle-of-the-pack performance it leaves our old VelociRaptors looking decidedly sluggish.

The only issue with the Torqx is one of cost. SSDs aren't cheap by any stretch of the imagination, but this drive is priced around $80 too high when looking at competing drives. Without industry-leading performance, it's hard to justify this premium price point.

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STEP 1
ASSEMBLE YOUR TOOLS

We'll need a Philips head screwdriver, small screws, your solid state hard disk drive, the adaptor rack and a SATA data cable. Also ensure you have a spare SATA power cable available from your power supply. The screws usually ship with the drive or 2.5-to-3.5in adaptor.

A bare bones and low budget steel rack, around $15 from a computer store.

STEP 2
ATTACH THE DRIVE TO THE ADAPTOR

Use the screws to attach the drive to the adaptor. In this case, we need to use the small holes on the bottom of the SSD, and attach it to matching holes on the 3.5in adaptor. Don't over-tighten the screws or you may strip the thread.

HOW TO INSTALL AN SSD

Nick Race goes through the process of installing a solid state drive into an existing system.

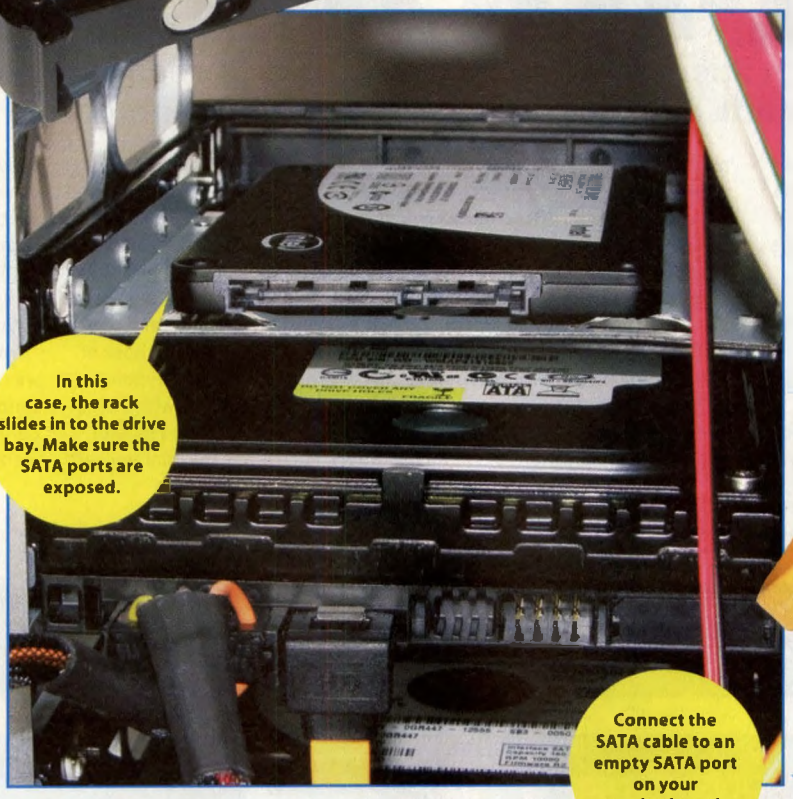
Installing an SSD for yourself isn't terribly complicated, but it does have a few extra steps involved than your "normal" hard disk drive. The biggest difference is the physical form factor. All the solid state drives on the market currently are built to the 2.5in form factor, compared to the 3.5in design of a mechanical hard disk drive. Unfortunately, that means that, without an adaptor of some kind, there's nowhere to mount the drive in your case.

There are two types of 2.5 to 3.5in adaptors we've identified. Here we are using the "screw down" type, in which the SSD is screwed down on to the solid adaptor plate, which can then be fitted anywhere a 3.5in drive is usually installed. The second type has you screwing two folded metal rails to the side of the SSD, which increases the effective width of the drive and lets you fit it in a 3.5in slot.

Most solid state drives sold in retail packaging ship with the necessary adaptors, but check before you leave the store, or you may find yourself coming back just for the rack.

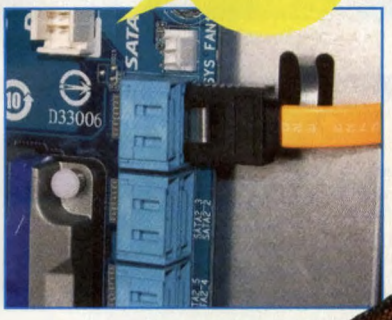
STEP 3
INSTALL THE DRIVE IN TO THE CASE

This is where your case may look quite different. Here in our example we're using a Cooler Master case, which includes plastic drive "racks" for slotting into a matching recess in the case. Your case may have a bare metal scaffold, where the drive adaptor can screw right in. In our case, we're slotting the adaptor and drive into the plastic rack, then slotting the rack in to the case with the SATA and power connector facing toward the rear side of the case.



STEP 4
CONNECT THE SATA CABLE

Grab your SATA cable and plug it in to the data port on the SSD. It might be a bit trickier than a standard drive, as depending on the adaptor installed, it may be recessed in the case. To keep our cables a bit neater, we wrap the SATA cable around the handle of a screwdriver (not too roughly). This shortens the effective length and lets you pull it gently to reach the SATA port on the motherboard easily.



STEP 5
CONNECT THE SATA TO THE MOTHERBOARD

Find the appropriate empty SATA port on your motherboard and plug in the other end of the SATA cable. Don't disconnect existing SATA cables (unless you're removing other drives), to ensure their data is still available.

STEP 6
CONNECT THE POWER

Find a free SATA power connector from your power supply and plug into the power port on the solid state drive. Close up the case, and we're all done with the hardware.

STEP 7
INSTALLING WINDOWS TIP

When you install Windows on your fresh SSD, it's best you don't unplug your old drive unless you're getting rid of it altogether. This lets the Windows install process update the boot records for the fresh install, so you won't have both installations of Windows vying to run your system.

AFFORDABLE CAMCORDERS

You don't need to spend thousands to be able to record good-quality video. **Christopher Zammit** looks at the most affordable camcorders for Christmas.

Changing technology and public taste has seen a growing demand for lightweight video recorders. With devices like the Apple iPhone being able to shoot videos and take still images, camcorder manufacturers have responded to the demand for high-quality compact recorders by introducing the mini HD 'pocket' camcorder category. These new devices are smaller, simpler and cheaper than anything that has come before them. Videophiles now have access to near-full HD technology in a smaller form factor and for a cheaper price than a standard SD camera of just a few years ago.

Users can record video for up to 16 hours in standard definition or 4 hours in Full HD (on average) before downloading their movies to a PC where they can then be edited more swiftly and simply than ever before.

With a rush of mini HD camcorders hitting the stores in time for Christmas, we've gathered up the most popular and tested them out in the field .

We've also sampled the most affordable full-sized HD camcorders from the major brands for those of us who have a bit more to spend and like our HD devices with a little more grunt. Keep in mind though, we are not putting the mini 'pocket' camcorders up against their full-sized cousins. Each category will be judged seperately with recommendations made from each.

After that, the choice is yours; it all depends on your needs and your budget.

Whichever category you choose, we can guarantee that any of the winners would make the ultimate Christmas gift for a lucky family member, or a treat for yourself.

UNDER REVIEW

Creative VADO

Flip Mino HD

Kodak Zi8

Kodak ZX1

JVC PISCSIO GC-FM1

Canon HF200

Panasonic HDC-SD20

Samsung HMX-H105

Sanyo XACTI

Sony HDR-TG5VE

What do I look for?

In an affordable camcorder...

Every camera in this round-up will do the job of capturing decent HD video for the average user. Before you decide which one is right for you, there are a few things to consider first.

SD OR HD

This is entirely up to the individual. You can get some great images form a standard-definition camcorder but we recommend that you go for HD if you have the TV to support it.

STILLS

If taking still photos with your camcorder is important to you, be sure to look for at least a 5-megapixel still camera feature.

ZOOM

Many of the smaller Mini 'pocket' camcorders don't offer a decent zoom. This is fine for your average day-to-day use but if you want more functionality then these may not be for you.

SSD

With the same functionality of flash drives, SSD is the latest storage method to hit the camcorder market, but be warned: it is a bit more expensive.

FLASH CARD

The ability to record straight to flash card as you would in your digital still camera makes getting your video off your camera and onto your TV or PC simpler.

PRICE

Don't assume that a cheap pricetag means a cheap build — a few of the mini camcorders have HD image quality to rival their larger and more expensive competitors.

Creative Vado HD

@ http://au.creative.com
✔ Simple USB plug and play; good microphone.
✖ Video quality is let down by a weak lens and shaky images.

Creative has certainly tried hard with the Vado HD. This compact unit has all the basics you could want in a pocket camcorder: simple USB connection, simple controls and very decent picture quality. There's even a mini HDMI connector with its own HDMI cable for outputting 1080i video to your HDTV. If you're not HD ready, there's also a standard composite AV connection available.

8GB of internal memory (double the Mino's 4GB) offers up to two hours recording space at the maximum 1,280 x 720p resolution, which is handy as two hours is the maximum battery life.

Creative offers a cool little package that includes all the cables you need (including the HDMI) as well as a clear silicone skin to keep your Vado HD safe. If showing off your movies online is your thing, the Vado includes an easy-to-use software package for video editing and enhancement.

One of the best inclusions is the flip-out USB connector that allows users to plug it into any PC or Mac and use it as if it were a portable drive. Videos are easy to access and don't require any third party media players or codecs to get them to run. The USB connection also acts as a charger, so if you're out and about you will need some kind of charging adaptor that accepts USB; either that or make sure you have a fully charged notebook handy.

Preset upload options are included for one-step uploading of videos to YouTube and Photobucket. There is also the option of knitting together a whole lot of short videos into one longer 'film'.

The image quality, although technically HD, is not as good as we would have hoped. Over-saturated colours and a whole lot of camera judder makes it less than stable to watch. The picture quality is still very good for its size and price, but for a little less money, we think you would be better of with the JVC Picsio.

Flip Mino HD

@ www.theflip.com
✔ USB plug and play; good low light recording.
✖ Not the best images; no SD expansion slot.

There's been a lot of hype about the Mino since its recent release, but sadly not all of it is justified. The Mino only has a 1.45in LCD display, which is a little on the small size compared to the competition. Although still very good for its size and price, the image quality comes in at third place out of the four pocket camcorders currently available. Images, although sharp, tend to look washed out and lack colour, even when tested on a bright sunny day. The Mino also doesn't handle bright light too well, as subjects in direct sunlight tend to flare out a bit more than is expected.

On the controls front, there isn't too much to fiddle around with here. There is the standard, large pause/record button with two buttons for zooming in and out as well as a playback button and delete, and that's about it. The zoom itself, as in most of the pocket camcorders, is weak and is better left alone. The inherent problem of camera shake is also obvious in the Mino as we found ourselves almost getting sea-sick when watching back the video. Another issue is the lack of an SD card slot, so you're stuck with the 2GB of internal memory that comes supplied with the camera. That in itself won't be a problem until you take it on holidays away from your PC where you can't back up and empty the drive.

On the plus side, the images are still quite good for its price and size and the sound quality is excellent. Low light recording is good with a lot less grain than other models. Included software for basic editing and uploading to YouTube, AOL, or MySpace makes the after-shoot process simple. The inclusion of a USB port also makes getting videos onto your PC a simple plug-and-play process. For the benchmark in the pocket camcorder range, the Flip Mino HD has already been surpassed by Kodak and JVC. It's amazing how a little competition can turn the king of the camcorders into just one of the crowd.

PREVIEW

Kodak Zi8

@ www.kodak.com.au
✔ 1080p resolution; image stabilisation; SD card expandability.
✖ Not released in Australia until early 2010.

The Kodak Zi8 does everything its little brother the ZX1 can do, but better. The only problem is, we can't really test it properly until it gets released in Australia early next year. But from what we've seen on paper, this looks likely to be the unit that solves all the other pocket camcorders' little quirks.

With full 1,920 x 1,080p HD recording that beats the JVC Picsio's 1,440 x 1,080, the Zi8 promises great image quality. An HDMI output on the camera is included for those of us who'd rather watch our videos on an HDTV rather than a computer monitor.

A range of shooting options are available for those times when you'd rather trade recording time for image quality. If you don't want to shoot at the maximum 1,920 x 1,080p setting which records at 30 frames per second, you can also capture images in a number of resolutions and frame-rate counts: 720p at 60fps, 720p at 30fps, 848 x 480 (standard-definition WVGA video), and even shoot still photos with a 5-megapixel sensor.

Although the Zi8 only offers 128MB of in-built memory, which is far less than its competitors, the inclusion of an SD card slot means that with a 32GB SD/SDHC card, users have the capability to record up to 10 hours of video in Full HD. A large 2.5in viewscreen should make shooting and playback of videos clearer than the Flip.

A standout feature is built-in image stabilisation that, although not as good as that found in a full-size camcorder, should go a long way in smoothing out the judders that are present in most of the competitors.

Navigation is also looks easier due to a mini-joystick that allows for more access to the camera's functions while away from the PC.

Although we can't officially score the Zi8 until it's release early next year when we can see one in the flesh, it's looking like being a major rival to JVC's Picsio. Roll on first quarter, 2010.

Kodak Zx1

@ www.kodak.com.au
✔ Good image quality; good, clear screen; YouTube uploading.
✖ Almost useless zoom; poor low light performance.

The Kodak ZX1 is a competent pocket camcorder set into a weather-resistant body. Its small size and pocket-friendly shape make it comfortable to carry around, although its controls could have been made a little larger and clearer. Despite their raised profiles, finding the right button at the right time takes some getting used to. Another negative is the fact that the unit gets its power from two AA batteries. This is totally unnecessary in the days of the rechargeable Lithium-ion.

It's not all bad news though. The Kodak Zx1 has a 2in LCD screen that is easy to see even in bright sunlight. Its image sensor captures video at a decent 1,280 x 720 resolution at a choice of either 30 or 60 frames per second, which ensures that its image quality is very good for its price. Although it's not up there with full-sized camcorders, the Zx1 does capture great images that look sharp and bright with great colour saturation. This is a mini HD camcorder that definitely looks HD.

As expected, like many pocket camcorders, it does suffer from less than perfect image quality in low light. The picture can tend to get a bit grainy and washed out but is still on the acceptable side.

An HDMI connection allows for viewing videos directly on your HDTV. USB is also supplied for those of us who like to edit our creations before viewing.

The addition of a three-megapixel still camera adds a bit of functionality at mediocre quality. Another negative is the built-in zoom that is weak and practically useless. We recommend you leave it alone and concentrate on moving the camera itself to fill the wide-angled 16:9 ratio recording area.

Despite its minor flaws such as the zoom and odd controls, the Zx1 gives you exactly what you want: a cheap, compact camcorder that shoots great images with a minimum of fuss. You could do far worse than grab a Zx1 for yourself this Christmas.

JVC Picsio GC-FM1

@ www.jvc.com.au

✔ Fantastic image quality; 8MP still photos; image stabilisation.

✖ On button can be stubborn.

Just released from JVC, the Picsio GC-FM1 is an impressive little unit. Smaller than the Flip and Zi8, the Picsio manages to squeeze a lot more functionality into its tiny frame than the competition.

For starters, it's the only pocket camcorder on the Australian market (at time of writing) to feature full 1080p HD recording. We were surprised to see that it is actually 1,440 x 1,080 rather than the expected 1,920 x 1,080. Still, that makes little difference to the picture quality, which we must say is the best of the pocket camcorders we've seen. Despite the highest resolution of any of the pocket camcorders, it still suffers slightly from image bounce and still gets the judders.

Image stabilisation is a big plus in a unit of this size. Although not as effective as what you find in a full-sized camcorder or DSLR, the Picsio does generate a smoother image than its competitors, especially when you're walking and shooting at the same time.

The inclusion of an 8-megapixel still camera offers the oppurtunity to take separate photographs at a higher quality than any other pocket camcorder. The only catch (and it is a minor one) is that you can only have one or the other. You can't take stills while recording video.

A good-sized screen makes playback clearer, although it does suffer the same visibility issues as every other camcorder. The digital 4x zoom actually seems to work, but slight pixellation of the image is evident when viewed on a larger screen. Still, despite this flaw, it is the best performing zoom by far.

With so many pocket camcorders coming in at the same price, the main differentiators are image quality and functions. The Picsio comes in first for functionality with its 8MP still camera, image stabilisation and (almost) full HD resolution. In the image comparison, which is still the most important factor, it trumps all with great images with saturated colours and crisp detail, all with less camera shake.

Canon Legria HF200

@ www.canon.com.au

✔ Free 8GB SD card included; image stabilisation; face detection; great images.

✖ Screen still hard to see in bright light.

Canon has been one of the big two in the stills camera market for many years. With the advent of digital recording, it has steadily begun to eat its way into the camcorder market with newer — and better — models each season. The Canon Legria HF200 is a mid-range high-definition camcorder that will suit anyone who wants to shoot full HD video on a budget.

Canon is phasing out its DVD and even HDD recorders to concentrate on the boom area of digital video: flash memory. The HF200 records AVCHD video to SD/SDHC memory cards that are portable and can be swapped over when full. They even throw in an 8GB card to get you started.

Something you don't see often at this price range is an external microphone jack for users who want a more professional result for their sound. A 15x optical zoom lens lets you get up close to your subject while a 3.31-megapixel 1/4in CMOS sensor ensures that every detail is captured. Full 1,920 x 1,080p recording gives you the maximum resolution for playback on your HDTV back at home.

On testing, we found the colours in both good and low light were bright and rich. There was only minimal grain visible in low lighting conditions, in which the focusing still managed to work well. The unit's compact size makes it a breeze to use and is just as comfortable to hold as the 'upright' models of camcorders like the Sony HDRTG5VE. A 3-megapixel still mode allows for taking the odd snapshot as you're filming. Though at such a low resolution we recommend you carry a compact as well if you want to capture something important. Face detection and image stabilisation are the two must-have functions that are both present in the HF200. Face detection ensures that people are well lit, while image stabilisation smooths out the camera shakes. Something most of the pocket compacts could do with.

$1,099

7/10

Panasonic HDC-SD20-K

@ www.panasonic.com.au

✔ Touchscreen: good images; lots of features.

✖ Poor low light performance; no internal storage.

Costing a little less than the other full-sized camcorders (let's ignore the Xacti for a moment), the Panasonic SD20 offers a good package for the amateur videographer. The SD20 comes equipped with a touch-screen interface, responsive automatic image adjustments and Panasonic's Intelligent Auto technologies that take all the guesswork out of getting the best images. Paired with image stabilisation, you end up with great results in most recording situations.

The SD20 has a very powerful single 1/6in CMOS sensor with a gross resolution of 1.47-megapixels for capturing images. That equates to better colour, better details and hence better images in good light. In low light, however, the SD20 gives the weakest performance of the full-sized camcorders, showing a slight colour shift and a bit of grain.

The lack of internal memory can be seen as either a good or a bad point depending on your opinion. If you have no issues with using separate SD cards to store your data then you won't have a problem. Although an internal backup would have been handy. At the full resolution of 1,920 x 1,080 the SD20 will fit two hours of video on a 16GB SD card, or six hours at the 1,440 x 1,080 setting that still produces great images.

Touchscreen functionality allows for more versatility for accessing menus and puts all the controls in one place. It does draw your eye away from the subject though, so its best to make any major changes while you're not recording — otherwise you'll find yourself straying off target. A built-in video light, optical image stabilisation and a great autofocus system make the SD20 a pleasure to use. The 16x zoom also works smoothly even if it is a little limited.

Although the image quality is slightly inferior to the Canon HF200, the SD20 still has some great features and good images, making it a good buy for anyone who wants to shoot HD video on a budget.

APC MAGAZINE HIGHLY RECOMMENDED

$1,199

8/10

Samsung HMX-H105

@ www.samsung.com.au

✔ Sexy design; great images; 32GB SSD drive; touchscreen.

✖ Focusing is a bit slow.

This is one sexy beast of a camcorder! Its glossy black body and chrome-like curves make it look a lot more expensive than it actually is. If bragging about your latest tech purchase is a hobby of yours, then you can happily tell your friends that you own the world's first Full HD camcorder with a built-in SSD drive.

The use of SSD makes the H105 a little smaller, a little lighter and a lot quieter than most camcorders, especially the HDD models. Startup is also a lot faster as there is less time while you wait for the drive to kickstart itself. The 32GB of built-in storage on the SSD drive should be enough for most situations, though Samsung has also included an SD card slot so you can record for as long as the battery lasts, which is reported as being up to five hours.

A 2.7in touchscreen adds to the H105's appeal, as you can do most of the in-camera adjustments right on the screen. The screen quality is excellent and is more easily viewed in strong lighting conditions than other camcorders.

Image quality is superb. Rich colours and crisp, sharp edges fill the screen, giving anything you shoot a richer, brighter look. The autofocus system works well in most situations but it did tend to get a little confused at times. This was only evident during fast pans and while zooming.

A rotating hand grip is another nice feature that allows for more freedom of movement and will banish the old hand-cramp problems associated with prolonged shoots.

The Samsung HMX-H105 manages to combine the features, functions and quality that you would expect from an HD camcorder with the look and feel of a cool and stylish twenty-first century piece of high-tech gadgetry. If looks are your thing, grab the H105. If you want slightly better image quality, we recommend the Canon HF200.

$400

6/10

Sanyo Xacti VPC-WH1

@ www.sanyo.com.au

✔ 3-metres waterproof; cheap; easy to use.

✖ Image quality not up to par; 1.1MP stills.

What? A full-size, waterproof HD camcorder that is only $400! It sounds too good to be true. Well, sadly, it is. Although the Xacti WH1 is sold as a full-sized HD camcorder, its image quality, although not bad, is nowhere near as good as its competition. In fact, we'd go as far as to say you would be better off grabbing yourself the JVC Picsio pocket camcorder for $100 less. The picture quality is comparable and the Picsio is a lot more portable. Add to that the WH1's piddling 1.1MP still images and you've got yourself a rather underwhelming package.

The Xacti WH1 sounds good on paper: it has face recognition and image stabilisation. The former does the job well, but the latter fails to remove most camera shake from even the least violent motion.

We're all familiar with LCD screens on camcorders being hard to see in bright light, but the WH1 seems even harder to see than most. Even the controls are simplified to the point of feeling non-existent. You get about as much functionality out of the WH1 as you would from a pocket camcorder.

Good battery life saves the WH1 from being a total lemon with recording times up around the three-hour mark. Pair that with a decent-sized SD card and you can easily get a whole day's worth of shooting out of it.

When shooting underwater (in this case, the local pool), the WH1's controls are easily identified by touch and the video quality is good for an underwater camera. Though it doesn't look like Full HD video (although it is), the video quality at least looks like very good quality SD video.

Granted, the Sanyo Xacti WH1 is cheaper than buying a more expensive HD camcorder and waterproof housing for those users who want to go snorkelling; if that's your thing, then the WH1 does the job. Just make sure you have something better for when you're on dry land.

$1,499

9/10

Sony HDR-TG5VE

@ www.sony.com.au

✔ GPS connectivity; looks sexy; light and compact.

✖ The most expensive of the lot.

Sony strays from the norm to bring us a titanium-clad, vertically transposed piece of kit. The TG5VE is perfect for travel and everyday recording with its slim body fitting into most pockets. Although it does weigh a bit more than a pocket camcorder, the size difference is minimal. A drooping pocket can be a tolerable nuisance for the increase in performance.

For something so small, the compact HDRTG5VE captures stunning Full HD at the maximum 1,920 x 1,080 resolution. Its slim body is not only lightweight and looks uber cool, it also houses a GPS receiver that allows you to map your photos and videos for uploading to Google Maps or Google Earth. While you're out and about, it will also adjust the camera's clock to the proper timezone and display your current position on the LCD map display.

It has 16GB of built-in flash memory that will allow for around two hours of shooting at the Full HD settings. Face detection and smile recognition brings still camera functionality to the camcorder to ensure better images.

An added bonus is the ability to perform Hybrid Recording to flash memory or Memory Stick media. This allows users to take still images at 2.3 megapixels while shooting HD video without having to switch recording modes. 10x optical, 120x digital zoom and a 2.7in LCD screen are features that make using the TG5VE more pleasurable, while 5.1 channel surround sound gives your videos a professional feel.

While Sony's TG5VE is the most expensive camera in this roundup, you can see where you're money goes. A smaller form factor, great HD image quality and features such as GPS, face detection, smile recognition and dual video/still recording makes it a desirable camcorder. If you've got the cash, grab the TG5VE, if not, Canon's HF200 will do the job just as well for $400 less.

ALTERNATIVE 1

$199
8GB model

4
10

Apple iPod Nano

@ www.apple.com.au

✔ Nice inclusion to a popular device for those who don't need quality video.

✖ Image quality only suitable for YouTube and lo-res uses.

Just in case you were thinking of getting the latest Apple iPod Nano for its new video feature, don't. Granted, the Nano is a great product that is a market leader in portable music entertainment, but in no way is it a suitable substitute for any of the camcorders featured in this roundup. With a native resolution of only 640 x 480 pixels, the image is still viewable but nowhere near as good as everything else on the market. In fact, it is on par with the video quality you would get from a compact still camera.

If on the other hand you were going to get an MP3 player anyway, the new Nano does include some great features such as an FM radio, up to 16GB of memory and the intuitive functionality we've all become so familiar with. When video quality is not an issue, the Nano has YouTube uploading software and 15 different image effects to play around with.

ALTERNATIVE 2

$999

6
10

Samsung HD Icon

@ www.samsung.com.au

✔ Decent HD video and 8MP stills.

✖ Still not as clear as some of the cheaper pocket camcorders.

The Samsung HD Icon is the first smartphone to include HD video recording, and it shows. The video images are good for its 720p resolution, although the lens and lack of functionality tend to let it down. A large 3.7in AMOLED screen makes playback a pleasure, although the image quality tends to suffer when viewed on a full-sized HDTV.
The controls are easy to use, with a simple two-step process to begin recording; you just have to remember where the video camera is amongst all the other functions in the phone's menu. If you're after both a mobile phone and a basic video recorder with a decent image, without all the bells and whistles, then the HD Icon will do the job for you. If on the other hand you are primarily after a cheap and compact device that will take great HD videos, then we recommend you stick to either the JVC Picsio or one of the full-sized camcorders. . . if you have the cash.

POCKET CAMCORDER SPECS

Pocket camcorders	Creative Vado	Flip Mino HD	Kodak Zi8	Kodak Zx1	JVC Picsio GC-FM1
Video resolution (max.)	1280 x 720	1280 x 720	1920 x 1080	1280 x 720	1440 x 920
Still images resolution	None	Stills from video only	1.6 megapixels	3 megapixels	8 megapixels
Video frame rate	30 frames per second	30 frames per second	30 frames per second	60 frames per second	30 - 60 frames per second
Zoom	2x digital	2x digital	4x digital	2x digital	4x digital
Screen size	2-inch	1.45-inch	2.5-inch	2-inch	2-inch
Storage type	8GB internal Flash	8GB internal Flash	128MB plus SD card slot	128MB plus SD card slot	SD card slot
Connections	Built-in flip-out USB, RCA, HDMI (HDMI cable included)	Built-in flip-out USB arm, HDMI Mini Connector	AV output, DC In, HDMI Output, headphone jack, microphone jack, USB 2.0	USB 2.0 (high speed), HDMI output, AV output	HDMI out (Mini), AV out, USB 2.0/1.1
Power	Rechargeable Lithium-Ion battery	Rechargeable Lithium-Ion battery	Rechargeable Lithium-Ion battery	AA batteries	Rechargeable Lithium-Ion battery

FULL-SIZED CAMCORDER SPECS

Full-sized camcorders	Canon Legria HF200	Panasonic HDC SD20	Samsung HMX-H105	Sanyo Xacti VPC-WH1	Sony HDR-TG5VE
Video resolution (max.)	1920 x 1080	1920 x 1080	1920 x 1080i	1280 x 720 (30fps)	1920 x 1080i
Still images resolution	2.76 megapixels	1.17 megapixels	2.2 megapixels	1.1 megapixels	2.49 megapixels
Recording modes	FXP 17Mbit/s, XP 12Mbit/s, SP 7Mbit/s, LP 5Mbit/s	HA 17Mbit/s, HG 13Mbit/s, HX 9Mbit/s, HE 6Mbit/s	H.264 HD	ISO standard MPEG-4 AVC/ H.264 (.MP4)	MPEG-4 AVC / H.264
Zoom	15x optical	16x optical, 1000x digital	10x optical, 100x digital	Max. approx. 50x	10x optical, 120x digital
Screen size	2.7-inch	2.7-inch	2.7-inch touchscreen	2.5-inch	2.7-inch
Storage type	Flash and SD card	Flash and SD card	32GB and SD card slot	Flash and SD card	Memory Stick Duo
Audio data	Dolby Digital 2-channel	5.1ch Surround, Zoom and Focus Microphone	AAC 48kHZ	48kHz sampling, 16-bit, 2ch, AAC compression	5.1ch HDMI Output, Dolby Digital 2ch
Battery life	Approx. 1hr 45min	Approx. 1hr 23min	Approx. 5 hours	Approx. 3 hours	Approx. 1hr 40min

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GXR

*Among interchangeable lens-type digital cameras with built-in flash when lens unit is attached (according to Ricoh survey as of September 14, 2009)

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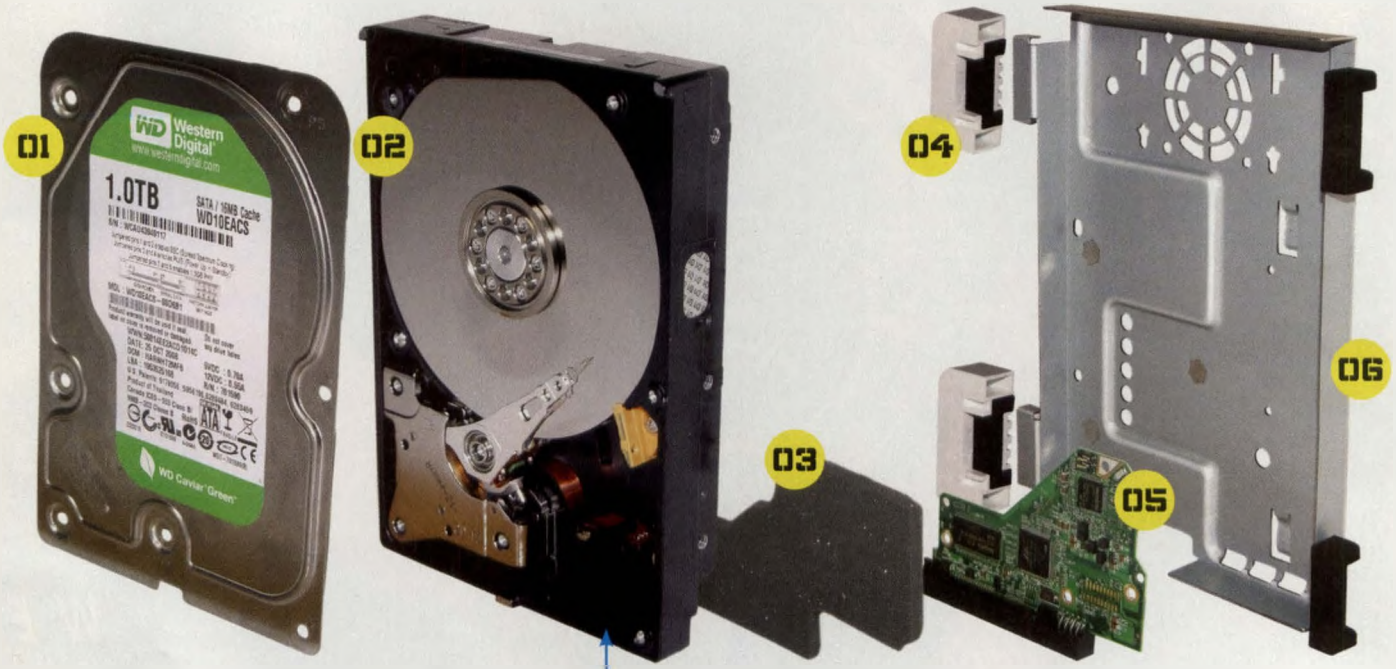
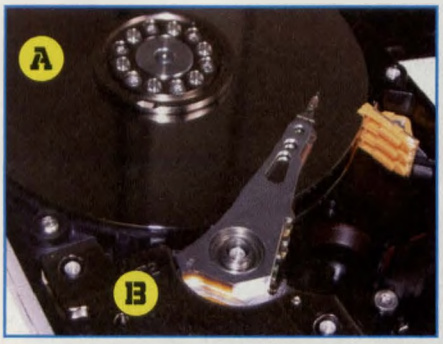
DNG SD HC USB PictBridge

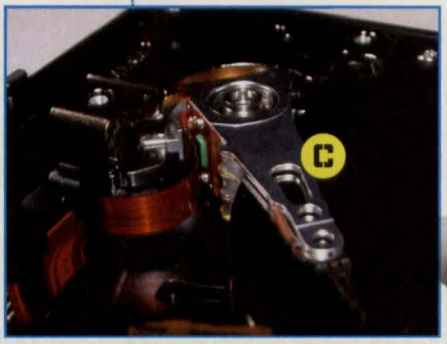
exploding tech

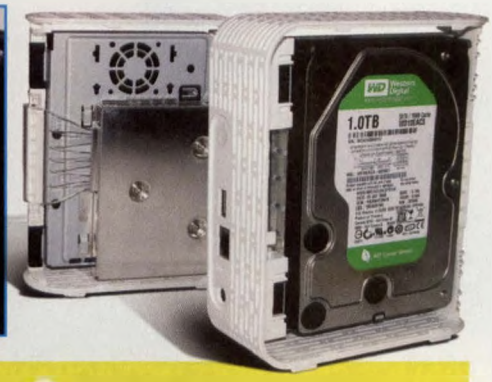
NO. 41

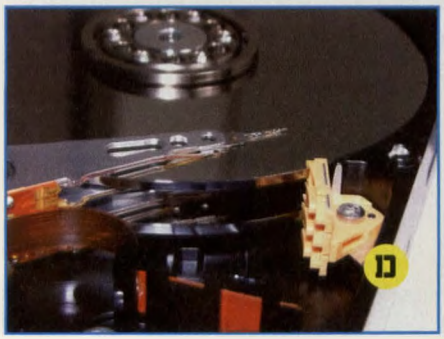
This month we take a look inside the **Western Digital My Book World Edition 1TB** to see what's inside a state-of-the-art, high-capacity hard drive.









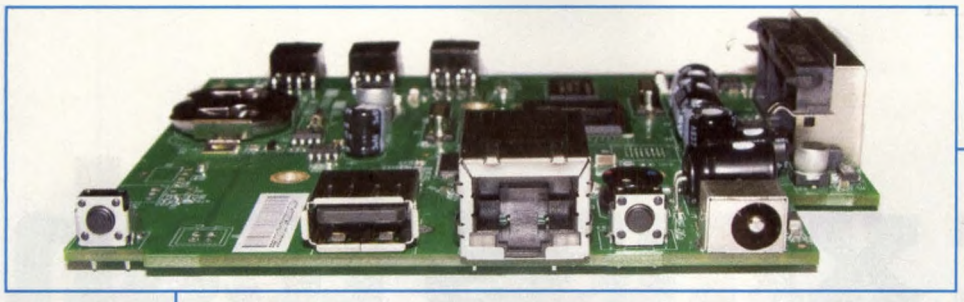


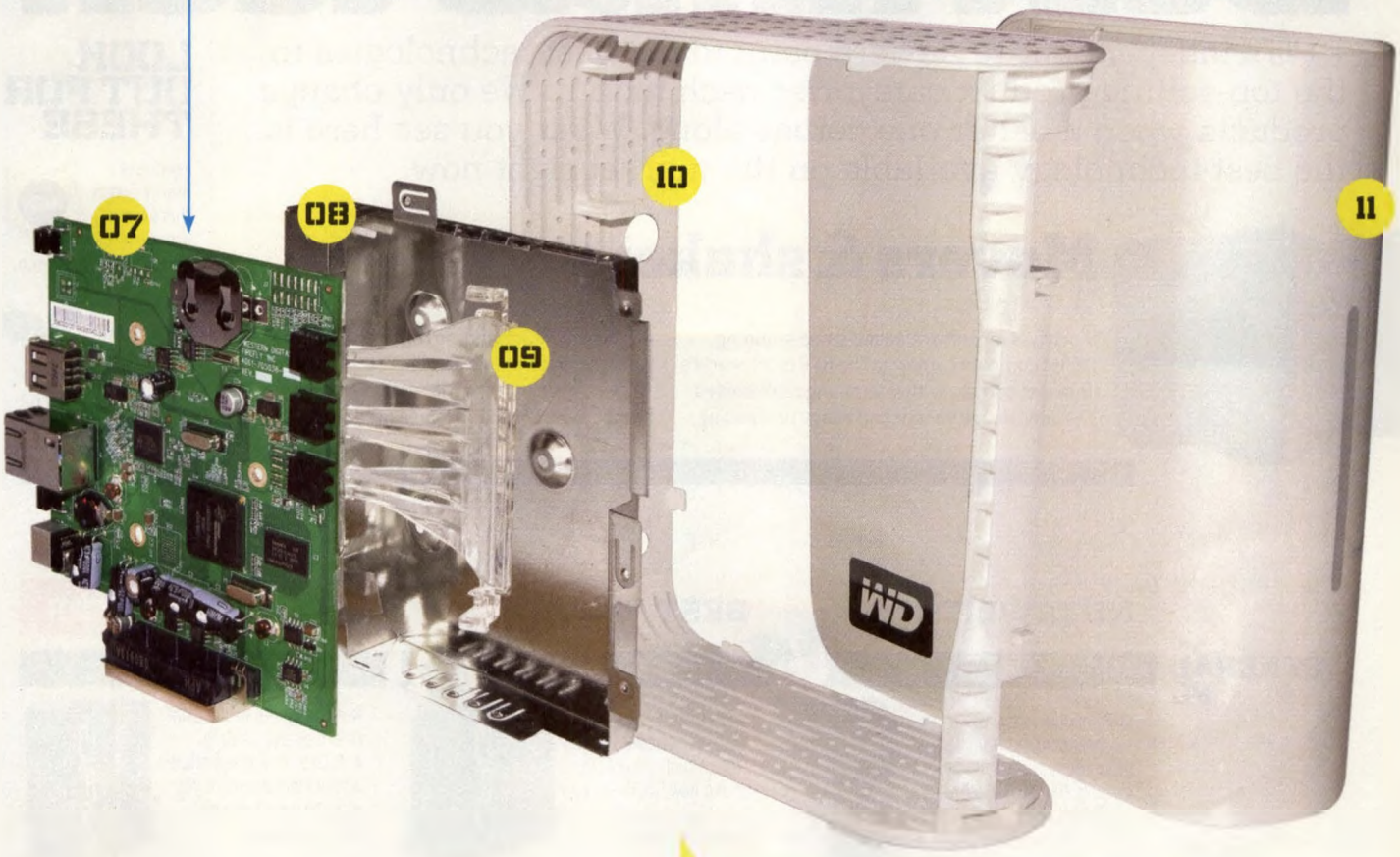
A THE PLATTERS
Platters using IntelliSeek Technolgy that calculates optimum seek speeds to lower power consumption, noise, and vibration.

B ACTUATOR COIL MOTOR
Varying the current in these copper coils causes their electromagnetic field to interact with the magnetic fields of the rare-earth magnets surrounding them. This allows the actuator arm to move rapidly across the platters.

C READ/WRITE HEADS
There is one set of read/write heads for each side of each platter located at the ends of the actuator arm. Each head skims along the platter at just a few microns above the surface.

D LOAD/UNLOAD RAMP
When the drive is not in use the read/write heads are parked on this ramp to protect the platters and drive heads from vibration and shock damage.





1 WD Caviar Green Hard Drive cover plate which acts as a dust cover and seals the drive. If removed, the drive is destroyed.

2 1 TB, 32MB Cache, SATA 3Gbit/s WD Caviar Green Hard Drive which utilises a reduced power consumption feature.

3 Insulating foam for the hard drives power board and connectors.

4 Rubberised drive mounts that also act as minor shock absorbers. There are 4 in total between case and board.

5 Hard Drive power board and connections.

6 Drive mount with rubber feet for connection to outer case.

7 Mainboard with Ethernet connection, CPU, USB connector and power inlets.

8 Main board enclosure.

9 Transparent plastic display for front light status indication.

10 Central body panel of the My Book that supports all internals including the drive.

11 Outer casing with clear status light window.

Western Digital My Book World Edition 1TB

Designed primarily as a central storage location for personal and media files, the My Book World Edition comes with the choice of either a 1TB to 4TB drive. If you should need more space, a USB 2.0 utility port on the rear of the drive allows for the addition of an extra external drive to create an instant storage network.

Compatible with both Mac and Windows files, the My Book can connect to multiple PC's on your home or office network via an Ethernet connection that plugs straight into your router. Inbuilt software automatically backs up files as you use them, ensuring that nothing is ever lost in the event that you forget to do a manual backup. This applies to all the computers on your network.

A built-in media server makes streaming music, photos and movies to any DLNA multimedia device possible. Playstation 3, Xbox 360, wireless digital picture frames, and connected audio receivers can be utilised to access the My Book's files wirelessly. Set up is easy; Mac and Windows computers will automatically find your My Book drive in seconds.

Christopher Zammit

Best xmas tech

APC's independent reviewers point to the best technologies in the top-selling product categories each month. We only change products when a better one comes along. What you see here is the best technology available on the market right now.

LOOK OUT FOR THESE

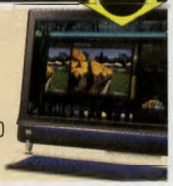
Products marked with this stamp are the latest additions to Best Tech. NEW

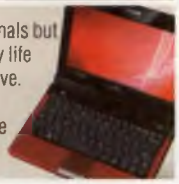
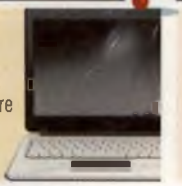
Products marked with this stamp are our recommendations for the best Xmas gifts.

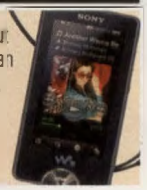
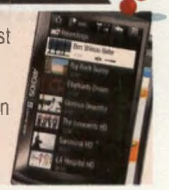
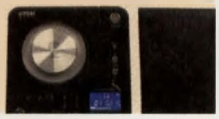
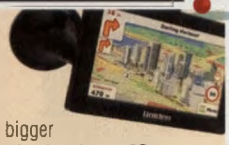
Movers & shakers

Ricoh GXR

Ricoh has recently released some stunning digital compact cameras. The GXR is the world's smallest camera with interchangeable lenses. The lens, image sensor and image processing engine are integrated, so the body itself does not contain an image sensor. The main benefit of this design is that each lens is finely tuned to its respective sensor and image processing engine.

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
GENERAL PC	**CPL Core i5 PC** This machine carries a lot of hardware considering the price. Built around the new Core i5, has 4GB of RAM and a 1TB HDD. $1,710 > CPL > cpl.net.au	**Altech NRG Typhoon i5** NEW A Core i5 PC with the high-performance touch from Altech, plus ATI's brand new 5000-series graphics card that supports DirectX 11. $2,439 > Altech > altech.com.au/nrg	**Altech NRG Storm i7** Not cheap, but with a Core i7 975 overclocked to 4.25GHz, this space shuttle booster will disorient you with the way it rips wait times to pieces. $7,899 > Altech > altech.com.au/nrg
PANEL PC	**Apple iMac 21.5-inch** When it comes to all-in-one panel PCs, Apple's iMacs rule. This is the new "small" version with 21.5in LED 1920 x 1080 display . $1,599 > Apple > apple.com.au	**HP TouchSmart 300 & 600** NEW HP' Touchsmart all-in-one, touchscreen PCs run Win 7 and are the closest thing to the iMac in the PC World. The 300 is the affordable one.  $1,699 > HP > hp.com.au	**Apple iMac 27-inch** NEW A stunning computer gets even better as Apple release the 27in iMac, complete with LED 2560 x 1440 display, as well as Core i5 CPU. $2,599 > Apple > apple.com.au
NAS HOME	**Linksys Media Hub NMH405** Automatically scours your network to find the multimedia files on attached systems, then copies or references them and plays them. $700 > Cisco > www.linksysbycisco.com	**Iomega Home Media Network** When nanna asks you what NAS she should buy, point her to this 1TB NAS designed to store and share images and multimedia across DLNA devices. $429 > Iomega > www.iomega.com.au	**My Book World Edition II** The ultimate backup and media storage for PC/Mac. Up to 4TB with mirrored RAID 1 drives and media streamer and iTunes server. $999.99 > WD > www.westerndigital.com

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
EXTERNAL DRIVE	**Iomega eGO Triple Interface Drive** Stunning portable 320GB and 500GB drive, with a suite of software and FireWire 800 and 400 ports as well as USB 2.0. $179 320GB > Iomega > www.iomega.com.au	**Iomega Prestige Desktop** Good-value external drive that gives you an instant 500GB through your USB port. And it looks pretty good as well. $150 > Iomega > www.iomega.com.au	**Seagate FreeAgent Xtreme** No RAID mirroring but still gives you one terabyte of storage and FireWire, eSATA and USB 2.0. Extremely fast performance. $480 > Seagate > www.seagate.com
NETBOOK	**Fujitsu M2010** Standard netbook internals but with exceptional battery life and a fast 5,400rpm drive. Also sturdier than most and better-than-average 2-year warranty.  $749 > Fujitsu Australia > www.fujitsu.com.au	**ASUS Eee PC Seashell 1005HA** The latest netbooks in the Eee PC range, the Seashells have a scratch-resistant "opalescent" plastic frame, ship with XP and a 160GB HDD. $599 > ASUS > www.asus.com.au	**BenQ Joybook lite U121** Fantastic machine. A next-gen netbook: amazing battery life, full keyboard, 11.6in screen. Get 2GB of RAM and you'll love it. $899 > BenQ > www.benq.com.au
NOTEBOOK ALL-ROUNDER	**Toshiba A500** Big brand, great-value entertainment notebook with a 16in screen, powerful graphics, HDMI connection and built-in TV tuner. $1,599 > Toshiba > www.toshiba.com.au	**HP dv2-1001AU** A fantastic offering, melding the price and convenience of a netbook with the powerful hardware and comfort of a fully-fledged notebook.  $1,199 > HP > www.hp.com.au	**Samsung X460** Thin and light, but with a 2.66GHz Intel Core 2 Duo P9600 processor. 4GB of DDR3 1066MHz RAM, and Nvidia GeForce 9200M GS graphics. $2,999 > Samsung > www.samsung.com.au
DESKTOP REPLACEMENT	**Pioneer DreamBook M57T** Obscenely powerful notebook, with an Intel Core 2 Quad QX9300 Extreme processor running at 2.53GHz and 4GB of 1,066MHz DDR3. $4,169 > Pioneer > pioneercomputers.com.au	**MSI EX625** Awesome value with a 16in 1,366 x 768 resolution LCD display and an ATI HD 4670 GPU which packs a 512GB of DDR3 VRAM. Uses Centrino 2 chips and 2GB of RAM. $1,399 > MSI > www.msicomputer.com.au	**HP Pavilion dv7-2111TX** An entertainment-focused desktop replacement, the dv7-2111TX has a Core 2 Quad processor, 17.3in widescreen, and ATI Radeon HD4650 graphics. Great HD movies. $2,799 > HP > www.hp.com.au
PHONE CONSUMER	**Sony Ericsson C510** Unprecedented set of high-end features for the money: HSDPA, GPS, Bluetooth, an accelerometer, and custom Facebook and YouTube apps. 3.2MP camera with auto-focus $389 > Sony Ericsson > sonyericsson.com.au	**BlackBerry Curve 8520** The Curve 8520 merges consumer features such as a touch-sensitive trackpad and media keys with traditional BlackBerry strengths. Uses GSM not 3G. Plan > Vodafone > Vodafone.com.au	**iPhone 3G S** Glorious user interface, 3G speed, and now faster CPU, slicker graphics, can shoot video and take better photos. Plan > Apple > www.apple.com.au
PHONE BUSINESS	**Nokia E63** Great all rounder with amazing battery life (11 hours talk, 18 days standby) superb keyboard and necessary Nokia apps. Has Wi-Fi and 3G. $399 > Nokia > www.nokia.com.au	**Nokia E75** Works like a BlackBerry with the new Nokia Messaging push email service. You can configure up to 10 Gmail, Yahoo Mail, Live Mail and other free and hosted email accounts. $979 > Nokia > www.nokia.com.au	**BlackBerry Bold 9700** NEW The new BlackBerry flagship, a tad smaller than the 9000 but with a higher-res screen. Also runs on the regional HSDPA networks of Vodafone and Optus, and Telstra's NextG. Plan > RIM > blackberry.com

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
MEDIA PLAYER	**Apple iPod nano** A new long narrow design with an accelerometer that kicks the nano into landscape mode when you hold it sideways. Now in 8GB and 16GB models. $199 > Apple > www.apple.com.au	**Sony Walkman X** This may be sacrilegious, but we think Sony's new Walkman X is better than the top iPod, with a 3.2in OLED touchscreen, noise-cancelling tech and Wi-Fi.  $649 (16GB) > Sony > www.sony.com.au	**Archos 5i** A tour de force — the most stunning media player yet, plays HD content and has in-built GPS, all running on Android. In 8GB to 500GB versions.  $445 8GB > Archos > itechinternational.com
MP3 DOCKS	**Altec Lansing octiv AIR M812** Unlike most other iPod docks, the dock and speaker connect to each other wirelessly up to 30m away. Produces a warm, well-balanced sound. $799 > Altech Lansing > alteclansing.com	**TDK NX-04CD remote & Mic** Audio performance blows similarly priced docks out of the water, and looks great. But it can also play music off USB drives and SD cards.  $300 > TDK > tdk-media.com	**B & W Zeppelin** Simply the best-quality iPod dock speaker system around, even if not the most expensive. So good you need 320Kbit/s tracks to get the most out of it. $1,300 > Bower-Wilkins > bower-wilkins.com
	Uniden TRAX 430 GPS Comms company Uniden has released a ripper of a GPS device, impressing with its ease-of-use, exceptional screen and ability to create 3D maps. $379 > Uniden > www.uniden.com.au	**UNIDEN TRAX 5000** We love Uniden because of its philosophy of delivering on the fundamentals — bigger screens, easier navigation, better 3D  $349.95 > Uniden > uniden.com.au	**TomTom GO 930** The top-of-the-line TomTom delivers traffic messaging, intelligent live routing, FM transmitter, voice-recognition and text-to-speech. $849 > TomTom > www.tomtom.com.au
COMPACT CAMERAS	**Ricoh CX2** The CX2 is even better than the CX1. Also with a DSLR-style CMOS sensor, the CX2 is one of our favourite compacts of all time. $599 > Ricoh > ricoh.com.au	**Kodak M320 Easyshare** The M320 is cheap, easy to use and produces great images. Takes a picture as well as a camera twice its price. $180 > Kodak > www.kodak.com.au	**Ricoh GXR** Lens, image sensor and image processing engine are one block, meaning the lens are tuned to the lenses. Price yet to be announced. TBA > Ricoh > ricoh.com.au
DSLR CAMERAS	**Canon EOS 50D** Although better than the 450D, the 50D's price stops it being in the Best Value category. Still not as good as the Nikon D90 but still a great camera by any means. $2,599 > Canon > www.canon.com.au	**Canon EOS 500D** The best low-price DSLR you can get. Suited to the amateur photographer, the 500D offers HD video and heaps of features in a tiny DSLR frame. $1,499 > Canon > www.canon.com.au	**Nikon D90** This is just sexy! The first DSLR with HD video, the D90 is the best non-professional camera you could get without sending yourself broke. $1,699 > Nikon > www.nikon.com.au
HD CAMCORDER	**JVC Picsio GC-FM1** Smaller than the Flip and Zi8, the Picsio manages to squeeze more functionality into its tiny frame, and it's the only one to record HD at a resolution as high as 1,440 x 1080p. $299 > JVC > jvc.com.au	**Sony HDR-TG5VE** For something so small, this captures stunning Full HD at the maximum 1,920 x 1,080 res. Its slim body is not only lightweight and looks uber cool, it also houses a GPS receiver. $1,499 > Sony > Sony.com.au	**Sony HDR-XR520V** Want the best consumer camcorder out there? With 240GB HDD storage capacity, 12MP still images and so much more. $2,699 > Sony > www.sony.com.au

maps.

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
PHOTO FRAMES	**D-Link DSM-210** 25cm Wi-Fi photo frame that streams net content and can accept content via a "widget" located on the PC desktop. **$499 > D-Link > www.dlink.com.au**	**Kodak P720 Touch Digital** Kodak's entry-level photo frame, with a good quality 7in screen and the excellent Quick Touch Border which makes it really easy to navigate menus. **$140 > Kodak > www.kodak.com**	**Samsung SPF-105V** Almost like a mini-TV with an impressive monitor and able to play MP3s and video files, plus lots of slideshow effects. **$399 > Samsung > www.samsung.com/au**
HDTV	**LG PS70** Features in-built "Time Machine" DVR recording. For this model, the PS70, just add a hard disk. **$3,299 for 50in > LG > au.lge.com**	**Panasonic TH-P42S10A 42** Panasonic's plasmas are now great value. This one has a superb picture, uses half the power of traditional plasmas and is Full HD. **$1,800 > Panasonic > www.panasonic.com**	**Samsung Series 9 46in** The first HDTV range to offer live internet content through RSS feeds, plus sophisticated LED backlighting produces blacks to rival plasmas. **$5,999 > Samsung > www.samsung.com.au**
TV TUNER	**Hauppage MiniStick-HD** The size of a small USB key, it's the smallest Freeview-tuned digital TV stick in Australia — great quality, cheap, and perfect for notebooks. **$69 > Hauppage > www.newmagic.com.au**	**Kworld DVB-T 395UR** A basic HD tuner card that allows you to watch HD digital TV on your PC or notebook. It's not flash, but it works well, is portable and convenient. **$79 > Kworld > www.kworld.com.tw**	**Hauppage Nova TD** The Nova TD USB stick has two HD tuners, is designed specifically for Freeview and comes with excellent drivers and software. **$179 > Hauppage > www.newmagic.com.au**
DISC PLAYERS	**Sony PlayStation 3 80GB** Yes, it's a games console, but it also doubles as a Blu-ray player that's as good as any standalone devices on the market. It's the same price as some of the better ones, so do your sums. **$699 > Sony > www.sony.com.au**	**Kogan Blu-ray Player** Basic, affordable. Plays back good quality HD and upscales DVDs. Now supports BD-Live (Profile 2.0) which it can receive internet content and firmware upgrades. Good buy at $249 . **$249 > Kogan > www.kogan.com.au**	**Sony BDPS350** Superb HD playback quality and does great upscaling of DVDs to high definition. Unlike the $1,799 Pioneer, available for around $400 on the street. **$400 > Sony > Sony.com.au**
DVR	**FOXTEL iQ2** If you watch pay TV, the FOXTEL iQ2 is a must. Records both standard and high-definition free-to-air TV to a spacious 320GB hard drive. **$10 month > FOXTEL > www.foxtel.com.au**	**TiVo HD** The TiVo's smart recording features (such as WishList) are the main reason you'd choose this DVR over the others, despite the fact that it won't record pay TV. **$699 > TiVo > www.tivo.com.au**	**Panasonic DMR-BW500** The ultimate high-definition DVR — can record two HD programs simultaneously to its 500GB hard disk or directly to Blu-ray media. A bucketload of connectors too. **$2,199 > Panasonic > Panasonic.com.au**
ROUTER	**D-Link Xtreme N Duo DIR-855** One of the fastest dual-band gigabit routers we've tested over short range, useful OLED display, and comes with great user documentation. **$479.95 > D-Link > www.dlink.com.au**	**TP-Link TL WR941ND Wireless N** A Draft 2.0 N router with MIMO, using three adjustable antennas for speeds of up to 200Mbit/s. Performance is decent and the documentation is good. **$129 > TP-Link > www.anyware.com.au**	**Linksys Dual-N WRT610N** It does dual-band Wireless N (5GHz and 2.4GHz), is one of the best performers in testing and looks great. Comes with Linksys' superb LELA network setup wizard. **$290 > Linksys > linksys.com.au**

masterbuilder

HOW TO BUILD THE ULTIMATE PC

APC MAGAZINE MASTER BUILDER PRO BUILD

One of the joys of computing is building your own PC. Each month a Master Builder will configure a PC for a specific task and pricepoint, recommending the best components for the job.

Build a multimedia PC for Christmas

You don't need very powerful components to make a media centre PC. Melbourne system builders, Centre Com, build one for us.

With Xmas so close it's a good time to build that media centre PC to play all those home movies and your favourite films and music during the holidays. We asked Centre Com, an Australian-owned chain specialising in OEM system building, notebooks and computer parts, to make available its Master Builders, Kevin Tran and Jessie Cassar to build one for us. Centre Com's Master Builders impressed us with their recent build of a basic Core i5 PC, and with this AMD-Athlon II X2-based system, show you don't have to spend a fortune to create a media centre.

CORE SYSTEM

SYSTEM COST $926

CPU

AMD Athlon II X2 Dual Core 240 2.8GHz — $72

When you're considering a worthy CPU for a media centre PC and weighing up all the relevant considerations (such as power consumption, noise, cost and versatility), it's really pretty hard to look past the good-value AMD Athlon II X2 240 with its Cool'n'Quiet & CoolCore technology. When this CPU is then paired with the ASUS motherboard (as we have selected directly below), it easily can handle all the latest HD movie formats for your viewing pleasure.

MOTHERBOARD

ASUS M4A785TD-M EVO — $125

(785GB, HT5200, 4DDR3, PCI-E 2.0, VGA, RAID, GB LAN, HDMI, mATX)

This motherboard is ideal for a home theatre PC. Packing a Radeon HD 4200 with hardware video decoding support, 7.1 channel audio, HDMI out and a host of other media PC features, the ASUS mobo still keeps power consumption and heat down.

MEMORY

Kingston 4GB (2 x 2GB) 1,333 kit — $99

When it comes to memory, the talk is generally of the latest, greatest and fastest kits available in the gaming and performance arenas. However, for a well-priced and reliable HTPC unit, you can't go past the reliability, warranty and name brand trust of a Kingston 4GB kit. With the bulk of the heavy work being done by the CPU and ATI hardware decoding, the last thing you need is the RAM letting you down during an exciting action scene finale!

GRAPHICS CARD

On-board Radeon HD 4200 — $0

The Radeon HD 4200 present on the motherboard will meet the graphics and HDMI requirements of an HTPC. Whilst under light load the ATI PowerPlay system will conserve energy, but when the going gets tough the HD 4200, with its dedicated unified video decoder (UVD 2) for H.264/AVC, VC-1 video formats and HD playback of both Blu-ray and HD DVD formats, really delivers!

AUDIO

On-board — $0

Our ASUS EVO motherboard provides excellent audio fidelity via its VT1708S 8-channel High Definition Audio CODEC and optical output. Supporting up to 7.1 channel reproduction this setup is suitable to pass through Dolby or DTS streams directly to a speaker system with a suitable decoder such as the Logitech Z-5500D 5.1 setup, or down-mix and output via HDMI or to standard stereo speakers.

Centre Com's Master Builders, (from left) Kevin Tran and Jessie Cassar.

HARD DRIVE

Western Digital 1.5TB Green Power SATA Hard Drive — $148

For a hard disk, the throughput requirement for video playback is quite trivial. The paramount considerations for a HTPC have to be noise, temperature, power consumption and reliability. In all four of these categories the WD Green Power series drives excel.

OPTICAL DRIVE

Pioneer BDC-202BK Blu-ray Combo Drive — $189

Blu-ray drives are now extremely affordable, even for most budget media PC setups. The Pioneer Blu-ray drive, which supports playback of DVD and other popular media, rounds out any HTPC's feature set perfectly.

CASE / PSU

Antec Micro Fusion Remote 350 — $218

[microATX HTPC Case — 350W]

The Antec Micro Fusion Remote 350 is a compact and lightweight housing for a media centre PC. Featuring an aluminium front bezel, an LCD display and a built-in IR receiver, the Micro Fusion Remote 350 looks like a high-end home theatre component, in a compact and low profile case. The addition of a 5.25in external drive bay means fitting a Blu-ray drive is a snap, and the easily accessible USB ports at the front are convenient for providing content via a USB drive.

TV CAPTURE CARD

LEADTEK DTV2000H PLUS HDTV — $75

The ability to watch, record and control not only file-based media content on your media PC but also HDTV broadcasts is a must-have addition for the TV buff. Has both Windows Media Center and Mediaportal to support recording of live TV on demand or via scheduling so you never miss that "must see" episode again.

EXTRAS

REMOTE

Logitech Harmony 525 advanced universal remote — $99

No Media PC would be complete without the inclusion of a Logitech universal remote. The Harmony 525 is fully programmable to control your media PC and all the home theatre extras you may have including your plasma or LCD television and speakers, and can even be programmed to do multiple tasks with one press, then once you're finished for the night, one press and everything goes to sleep.

KEYBOARD/MOUSE

Logitech Wireless Desktop MK300 keyboard and mouse Kit — $59

For those wanting a little more control of their HTPC, a wireless keyboard and mouse combo is the ideal solution. Tuck them away when not in use and no unsightly cabling protrudes from your system. Logitech's MK300 kit delivers good build quality and wireless reliability at low cost.

MONITOR

BenQ 24in G2420HD LCD — $269

Sporting good colour reproduction, Senseye technology to keep fast action scenes smooth and plenty of multimedia-friendly inputs for devices such as consoles and Blu-ray/DVR players, this 24in latest-generation LCD is a good choice for builders looking for a primary media display or as an addition to make use of the PC side of things.

OPERATING SYSTEM & SOFTWARE

Windows 7 Home Premium — $199 (upgrade)

Win 7 is the operating system of choice, so if you already own a copy then the new and improved Media Center fits the bill perfectly. For those still using an older Microsoft OS, the excellent and free to download Mediaportal (mediaportal.com) software will provide a similar feature set. When buying a number of parts for building your HTPC you may qualify to purchase an OEM copy of Windows 7 starting at around $129, so ask your retailer for qualification details.

TOTAL WITH EXTRAS: $1,552

Master Builder Competition ROUND TWO

We want to find APC's first reader-based Master Builder. There is no such thing as the perfect PC, and no totally right or wrong way of building one. It means we can unleash the creativity of our readers in our Master Builder competition, in which you enter your PC and have it judged by some of Australia's finest professional master builders. The prize for the eventual winner is a stunning high-performance PC.

How the competition works:

Entrants send us the specs of a PC they have built, explaining what the PC is designed to do. We'll assess each entry on how well it delivers on its mission, with particular focus on:

- Are the chosen components the right ones for the job?
- Do the components work well together or are there better combinations?
- Is the spec good value for what it achieves?

We'll pick the best entries and publish them in the magazine over five rounds. Each month we pick a winner, who receives that month's prize.

All published entries will go into the semi-finals to be featured in the April 2010 issue.

The semi-finalists will be given a special challenge, and the top four builders will go into our finals, to be featured in our May 2010 issue.

The finalists will be flown to *APC*'s Sydney Labs to build a PC from a large selection of components. All finalists will also receive a selection of PC components to take home. The winner takes away a full Extreme Performance PC.

What the judges will look for:

Master Builder is not a competition just for overclockers or for building the most powerful PC. Instead, it aims to reward readers who put together a well-balanced PC, with a good selection of components that work together to create a machine whose sum is greater than its parts. The machine can be budget, high-performance, home theatre or any other type of PC you choose. The category is not as important as whether the chosen configuration delivers on its promise.

ENTRY AND PRIZES

Go to apcmag.com/masterbuilder.htm

Submit your PC configuration to *APC*'s Master Builder competition and, if chosen to appear in the mag, you will win your very own Intel Core i5 quad-core chip and *APC*'s professional Master Builders will also give you some advice on your machine.

PLUS! Our judges will select a winner in each round who takes home a special prize. This month it's an AMD Phenom II X4 CPU. AMD Phenom II processors have the processing power with the responsiveness to do it all, featuring next-generation quad-core design that crushes even the most demanding tasks. So if you play it, create it, design it, render it, stream it, and HD it, the AMD Phenom II processor is the must-have performance processor behind the best PCs for a high fidelity, high definition video entertainment experience.

THE JUDGES

THE MASTER BUILDER COMPETITION WILL BE JUDGED BY FOUR PROFESSIONALS:

DAVID KONG — ENSPIRE

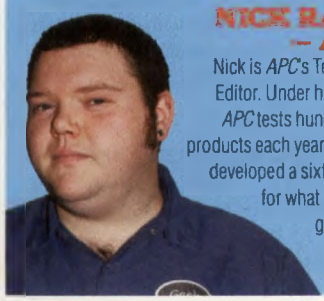
David features regularly in *APC* as a professional master builder. He knows what it takes to build a great PC and knows the capabilities of components from a variety of manufacturers inside out..

MICHAEL LEINS — ALTECH

Michael is Altech's R&D Engineer, whose high performance PCs regularly win Editor's Choices in APC. He is constantly testing and evaluating the latest and next generations of PC hardware.

JEFF LI — PIONEER COMPUTERS

Jeff Li never ceases to surprise *APC*'s staff with his latest creations, which can range from insanely powerful notebooks to small form factor PCs. Jeff knows how to build anything and often does!



NICK RACE — APC

Nick is *APC*'s Technical Editor. Under his watch *APC* tests hundreds of products each year, so he's developed a sixth sense for what makes a good PC.

A DECADE OF EXCELLENCE...REBORN
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"ORIGIN designs the best custom PCs for the true gaming enthusiast"
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Walden Wong
Budget gaming PC

Already with an IT degree, Walden builds his first PC.

SYSTEM COST
$927

Everyone seems to want to build a gaming PC, and so did Walden Wong. "This was the first time I built my own PC and I found it child's play," he says. But then, he *does* have an IT university degree, so we were keen to see what an IT Pro having his first go at building a PC would come up with — in contrast to many of our enthusiast readers.

CPU
Intel Core 2 Duo E8500 — $249
Specified to run at up to 3.16GHz, the E8500 provides a good trade-off between processing power and cost without needing to overclock. Overclocking a slower (but cheaper) CPU is another option but the cost of buying a better cooler than the stock cooler and better thermal paste can negate the savings made in buying a cheaper CPU, not to mention the extra time and effort that must go into checking that the overclocked system is stable.

MOTHERBOARD
Gigabyte G31M-ES2L — $65
This micro ATX motherboard has almost everything I wanted at a low price. There is support for up to 8 USB ports and 4 SATA ports. The only thing missing that I would have liked is for the graphics card slot to have been PCI Express 2.0 compliant.

RAM
2 x 2GB Kingston 800MHz — $64
4GB should be sufficient to run most, if not all, of the latest games comfortably, and installing two matching modules means faster (dual channel) memory access.

GRAPHICS
Gainward 512MB 9800GT — $123
This graphics card uses a single PCI Express x16 slot and does not need additional power to be connected, making it suitable for my system (which only has one x16 slot on the motherboard and a 430W PSU). The on-board fan automatically lowers its speed after boot-up so that it is barely audible, plus there is an HDMI output port as well as VGA and DVI-I.

AUDIO
On-board Realtek Audio chipset — $0
The on-board audio can provide high-definition 7.1 channel output, so I didn't bother getting a sound card.

HDD
WD Caviar Green SATA 1TB — $112
Plenty of storage space, probably more than I need now, but it will cater for future needs.

OPTICAL DRIVE
Samsung SH-S223B — $49
This is a SATA 22X DVD writer that does the job at a budget price.

PSU
Antec EarthWatts 430W — $0
The PSU came with the Antec case. The motherboard manual recommended a 500W or greater power supply but I found that 430W was sufficient for the system configuration I had.

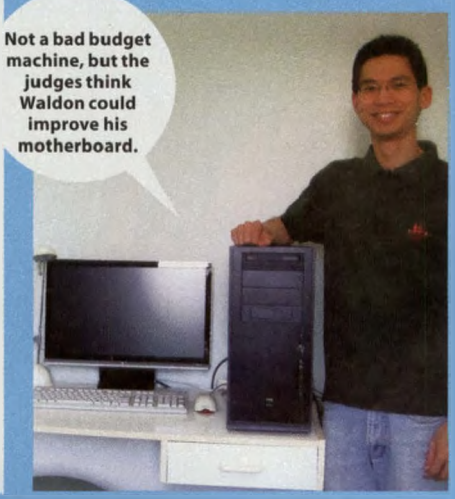
EXTRAS

MONITOR
21.5in BenQ E2200HD — $222
Increasingly, games support widescreen HD mode, and this monitor seems to get recommended often in PC magazines, so it didn't take too long for me to decide on it. There is an HDMI input port on the monitor, which should come in handy for connecting future devices that have HDMI output.

KEYBOARD AND MOUSE
I used my previous ones, so no cost.

OPERATING SYSTEM
Windows Vista Home Premium — $159
This OEM package came with a free Windows 7 upgrade. I decided to get the 64-bit version to be able to access more than 4GB of RAM if I need to later.

Total including extras: $1,208



JUDGE'S VERDICT: WALDEN'S GAMING PC

Working to a budget is tough, but Nick Race thought Walden had shot himself in the foot with his choice of basic motherboard. David Kong and Jeff Li agreed. Kong said: "The board he's chosen is a pretty basic board designed more for basic internet use than gaming. A better board would give him a PCIE 2.0 slot and more expansion options as the G31 chipset is limited to 4GB of RAM." Walden's selection of a Western Digital Green drive also raised eyebrows. Jeff Li said: "I find green drives make great data drives and slow OS drives. I would prefer to sacrifice capacity for a black edition drive." Nonetheless, the judges agreed the machine was not a bad budget configuration and Michael Leins liked the HDMI port on the video card, given that the E2200HD monitor has the input.

APC MAGAZINE MASTER BUILDER COMPETITION ROUND 2 WINNER DECEMBER 2009

David Pierson Multimedia and gaming PC

Intel's powerful i7-920 quad-core CPU is put to good use.

SYSTEM COST $2,047

David Pierson is a young film-maker and programmer from Queensland. He says his multimedia and gaming machine "is very quick in rendering and is a vital asset for my video-editing projects and multimedia work." All he needs now, he says, is a HDTV capture card. David creates computer games and utilities. You can view his work at **www.stritecsoftware.webs.com**.

CPU
Intel Core i7-920 — $420
The Core i7 is excellent for running multimedia apps like Adobe After Effects, which on this quad-core CPU can utilize all 8 threads, offering blistering rendering times with the high-def footage I work with. It also has excellent performance in CPU-intensive games.

MOTHERBOARD
ASUS P6T — $340
This board has everything I need, with triple-channel DDR3 RAM and a good upgrade path.

MEMORY
G-SKILL 6GB kit — $162
Having 6GB of RAM enables the system to run in triple-channel DDR3. This is essential for the work I am doing and lets me run many apps in the background with 64-bit Windows 7.

GRAPHICS
1024MB INNO3D GTS 250 — $186
The GTS 250 is a decent card, which can aid the CPU in rendering and is also excellent for gaming for its price.

SOUND
Onboard — $0
The ASUS P6T provides onboard HD audio, which offers crisp and clear sound on my 5.1 surround setup.

HDD
750GB Seagate — $150 (x3)
Getting three 750GB hard drives was essential for my HD video editing, and the Seagates came at a good price per GB. I have one for my OS and apps, and the other two are for work and backup. I also have 500GB and 320GB external drives for backup, so it's just over 3TB of space.

OPTICAL
LITEON dual-layer DVD durner — $58
This burner is adequate for now and was inexpensive. When the prices come down later on I might consider upgrading to a Blu-ray drive.

POWER
850-watt Antec Signature — $263
It provides an excellent power output for all my components and is a PSU that I can rely on.

CASE
Antec 900 Two - $168
This case not only looks good but provides excellent cooling of the components with the five installed fans. It also has plenty of room for additional hard drives. The three washable air filters help to keep the dust from entering the case and also give a very good indication of how much dirt I breathe in.

EXTRAS

DISPLAY
19in CRT Compaq 9500 — $20 (x 2)
These monitors are good for working with multimedia apps and documents and provide decent crisp pictures. Having two gives me more space for running CPU and GPU monitoring programs. For gaming I disable one using DisplaySwitch in Win 7. Eventually I will consider upgrading to two 22in widescreen monitors.

KEYBOARD AND MOUSE
Wave Logitech Keyboard and PS2 Laser Mouse — $50
The Wave keyboard is ergonomic which is excellent for typing and gaming.

OPERATING SYSTEM
Win 7 Home Premium (upgrade) - $199
The 64-bit version ensures I can utilise the full 6GB of RAM and my 64-bit apps make full use of the hardware. Before the RC expires, I am planning to buy the full copy of Windows 7 64-bit.
Total including extras:: $2,336

David's combination of well-thought parts have made him this month's winner.

JUDGE'S VERDICT: DAVID'S MULTIMEDIA AND GAMING PC

The judges thought David Pierson had done a nice job, even allowing for his sizable budget. Jeff Li said: "Intel's Core i5/i7 systems have the processing power and multimedia strings for any task you can throw at them. David has backed it up with plenty of cooling, power and balanced the price with a basic video card." The judges did question, however, Pierson's excessive spend on the PSU. "For me I would settle for a lower-rated but good quality 700W and bump up the graphics card to one of the new ATI Radeon 5850 cards," Kong said. Race added: "I can't help puzzling at the hard disk drive setup. Putting those three 750G drives in a RAID 5 array would help in the case of drive failure, and see better performance over a single drive for the operating system (and presumably software)."

Justin Goldsworthy
Ultra-affordable all-round PC

A young reader builds his first PC with the budget he can afford.

SYSTEM COST $570

Justin Goldsworthy is 12 and is so pleased with his first PC that he has entered the configuration into our Master Builder competition. He had to work to a strict budget, and says "I wanted to build a PC that could take all my games, support all the programs that I threw at it and be able to run multiple programs at the same time."

CPU
AMD Phenom X4 9650 2.3GHz — $150
I wanted a quad-core CPU because it would support all my games and play movies without freezing. The AMD Phenom X4 9650 will also support overclocking and it's a great price for what you get.

CPU COOLER
Stock Cooler — $0
At no cost, you're hard pressed to go past a stock cooler!

MOTHERBOARD
Gigabyte GA-MA780G-UD3H — $130
I wanted a motherboard with a dual BIOS and which would be stable when overclocking, so the Ultra Durable 3 series was my pick.

MEMORY
Corsair 4GB 800MHz — $90
I wanted 4GB because I might get a really high-powered graphics card, and 4GB will run anything I want.

GRAPHICS
ATI HF3200 onboard graphics — $0
I didn't have much money so I got the motherboard with the best onboard graphics. It's alright; it has an HDMI port but does lag a bit when playing high-powered games. Other than that it does the job. Obviously this one component I would lookto upgrade when I get some more money.

AUDIO
Onboard 8-channel HD audio — $0
I didn't mind what sound card I had, so onboard sound was alright — I can still hear everything.

HDD
400GB Samsung hard drive — $100
I inherited this hard drive, so I didn't want to spend money on a new one. It still provides me with plenty of storage at this stage so it was a bonus to have it available.

PSU
Cooler Master 450W — $50
I already had this PSU, and it would run smoothly for what I was doing.

CASE
No-name — $50
Not really sure what brand the case is, but I already had this one which has good cooling, so I didn't buy a new one. In future I want an Antec 902.

EXTRAS

MONITOR
LG Studioworks 995e — $0
I'm currently using this monitor because my grandpa didn't want it anymore. He offered it to me so I took it.

KEYBOARD
Logitech G15 — $140
I got this keyboard for Christmas off my grandpa. I asked him for it because it was a decent one that has extra keys for gaming and a screen to show me the temp of CPU.

MOUSE
Logitech VX Revolution — $140
My grandpa gave this to me for my birthday, I asked for a wireless mouse so he chose this one.

OPERATING SYSTEM
Win 7 Home Premium (upgrade) - $199
It was the cheapest 64-bit version of the new OS and it suits my needs.

Total including extras: $1,049

For his budget, Justin has put together quite a good machine with upgrade potential.

JUDGE'S VERDICT: JUSTIN'S ULTRA-AFFORDABLE PC

The judges agreed this was a machine limited by its tiny budget. Ideas where to improve it focused on the video card. "The CPU and motherboard are fine but, in my opinion, a dedicated video card is needed," said Leins, adding "the HD3200 is a great onboard chip with HDMI and is really good for HD playback in a media centre but will let you down in gaming." Kong added: "The choice of motherboard and CPU is wrong for his goals. A higher-clocked dual-core with a separate graphics card will give Justin more playable frame rates. To accommodate the graphics card, I'd probably go with a more basic motherboard." Li said: "To me, the value of this system is that the choices Justin has made in his configuration easily allow for upgrades to allow the system to grow with his requirements."

Matt Witherow All-rounder PC

Powerful, overclockable, plays games and it's under $1,000.

SYSTEM COST $985

Matt is the computers go-to-guy amongst friends and family. When asked to build a new system from scratch for a friend he decided to build himself one too. He wanted a system that he could take to a LAN party, was overclockable and would fit into his strict budget.

CPU
Intel Core 2 Quad Q6600 — $330
I managed to get this CPU on special because the store was overstocked. It was very appealing to me as it appeared to be the entry level of the quads, the lowest of the best. Has a nice large cache (8MB) and is overclockable.

CPU COOLER
Xigmatek Red Scorpion S128 — $45
All I wanted was performance, noise and price. Answer: Red Scorpion. It delivered even more than I expected and abolished my doubts about the direct-touch approach. As an extra bonus, it looks awesome too.

MOTHERBOARD
ASUS P5KPL-CM — $80
I was tight on budget and settled on this bargain board. It could overclock and met my basic needs for a board. However, I now have concerns the bottle-neck of my system will be its G31 chipset. The next upgrade will certainly be my motherboard. I'm thinking of a P5Q PRO (mmm).

MEMORY
Team Dark 800MHz DDR2 2GB — $70
My budget board only allowed for two modules so I decided to cut costs and, instead of getting 4GB of Kingston memory, I bought this higher-quality overclocker's RAM for less. It has better clock timings and is equipped with heat sinks and an overclocking warranty.

GRAPHICS
Nvidia GeForce 8800GT 512MB — $200
I was pleased to hunt down such a scarce card. Many people overlook this card but it can really perform. My friend bought a 9600GT for twice as much and our cards perform identically (except mine falls behind in pixel shading). The 8800 equals bargain performance.

HDD
Samsung HD501LJ 500GB — $75
Nice HDD with room for all those games patches and large RAW images I store. It seemed a sensible choice.

PSU
SPEED Power Series 800W — $130
I know, it's a lot. It was on offer when I bought all my parts and I couldn't pass up the sale, especially when I had a much more impressive LAN machine in mind for the future. I knew least about PSUs and I was assured this particular unit, which was designed in Australia, was extremely efficient.

CASE
Cooler Master Elite 334 Tower — $55
Looks very sleek and was nice and cheap. It just needed to be able to fit my cooler. Vibrates sometimes, but paper fixes that.

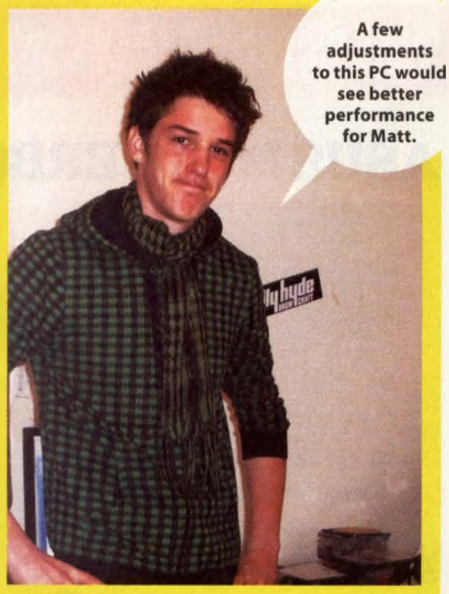
EXTRAS

MONITOR
BenQ 22in LCD monitor — $250
An unbelievable difference from my old CRT monitor; that was like looking into a rear-view mirror. This is literally like having twice as much space.

KEYBOARD AND MOUSE
Logitech / Mouse combo — $20
Basic but does the job.

OPERATING SYSTEM
Win 7 Home Premium (upgrade) - $199
Like everyone else, I could not wait to put Windows 7 on my system.

Total including extras: $1,454



JUDGE'S VERDICT: MATT'S ALL-ROUNDER PC

Some elements of this PC puzzled the judges. "A few strange choices here," Kong said, "teaming low latency memory with a budget motherboard, in my experience, has never been a good idea. Most budget motherboards are not very good at running high performance memory with the system becoming unstable at lower latencies." Leins added: "We have a massive overkill on the PSU. It's good to keep some room for upgrades but we should remember that with new upgrades the efficiency is likely to be way better than now. Consider adding more memory, as 2GB is underkill these days in a gaming system and when you do go 64-bit on the OS." Li suggested a 600W Vantec PSU instead, saying "it supplies ample power, is a better brand and would allow Matt to get the motherboard he wants for the same system price."

ASUS® MASTER CHALLENGE

BUILD A GAMING PC

Think you could create a great gaming PC? Send us a PC configuration which includes one of the ASUS motherboards *and* graphics cards listed below and you could win an ASUS P7P55D motherboard!

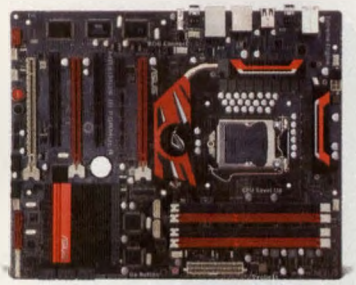
APC and ASUS will award the prize to the entrant they believe makes the best use of one of the nominated motherboards and graphics cards. You don't have to physically build the PC, just define it on paper. Try to pick other components that complement the characteristics of the particular motherboard and graphics card and explain why your creation should win.

Go to apcmag.com/masterbuilder for the entry form.

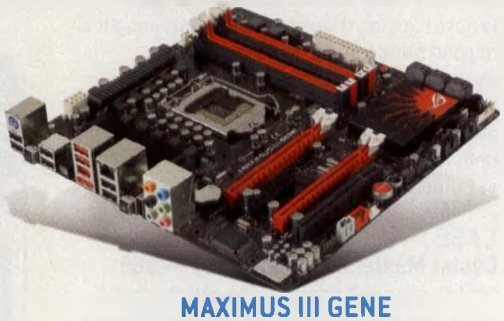
ASUS P7P55D
Our prize is the P7P55D, which features Hybrid Design for enhanced performance and overclocking. This is the ideal motherboard for your new Core i5 or Core i7 build!

MAKE SURE YOUR ENTRY INCLUDES BOTH A MOTHERBOARD *AND* A GRAPHICS CARD FROM THOSE LISTED BELOW.

ASUS MOTHERBOARDS



MAXIMUS III FORMULA



MAXIMUS III GENE

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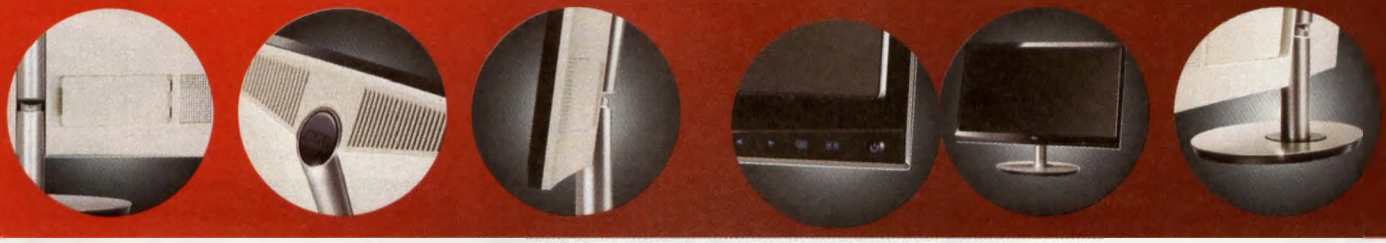

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Best builds

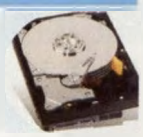
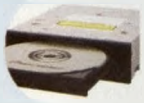
APC writer and reviewer **Bennett Ring** recommends the best components for three PC builds.

NEW

BENNETT RING

Bennett has been overclocking since the Duron days, and began his career as a tech reviewer last century.

	HOME-THEATRE PC $1,200	SMALL P55-BASED PC $2,781	VIDEO-EDITING PC $7,200
CPU	Intel E1500 This 2.2GHz Celeron is fast enough for HD decoding, while the extremely low voltage allows for silent cooling. Intel > www.intel.com.au $85	Intel Core i7 860 Great potential at stock and highly overclockable. Early testing shows it could potentially be another 4GHz stable 24/7 processor. Intel > www.intel.com.au $375	Intel Core i7 950 Video editing demands CPU cycles; the 950 has plenty to spare. Slightly cheaper than the insanely priced 875, but almost as fast. Intel > www.intel.com $790
COOLER	Intel stock cooler Set the stock HSF speed to low and your HTPC will be the quietest component in your AV rack. Intel > www.intel.com $0	Intel stock cooler Due to the 82mm height restriction imposed by the Silverstone case, HSF options are limited. Stick with the default unless overclocking. Intel > www.intel.com $0	Zalman CNPS10X Extreme While it's a little tricky to mount, it'll cool the 950 at a much quieter volume than the stock Intel cooler. Zalman > www.zalman.co.kr $90
MOBO	ZOTAC GeForce 9300 Mini-ITX The GeForce 9300 chipset provides plenty of grunt for Blu-ray, and it's one of the few mobos to support the relevant high-end audio codecs. Zotac > www.zotac.com $270	Gigabyte GA-P55M-UD4 Gigabyte has a full range of P55 motherboards coming for the Intel LGA1136. This micro-ATX based board is perfect for a midget beasty. Gigabyte > www.gigabyte.com.au $230	Gigabyte GA-EX58-UD5 With six DDR3 memory slots and a whopping ten SATA ports, this motherboard has plenty of room for memory and storage. Gigabyte > www.gigabyte.com.au $400
RAM	2GB Corsair Value Select PC-5300 2GB is plenty of memory for basic HTPC duties, and keeping to a single stick will leave plenty of space inside your case for airflow. Corsair > www.corsair.com $40	Corsair CMD4GX3M2A1600C8 Competitively priced dual-channel DDR3-1600 kit based on a 2 x 2GB configuration and latencies of 8-8-8-24 – perfect for this budget. Corsair > www.corsair.com $190	Kingston 6GB ValueRam DDR3 x2 One of the cheapest DDR3 packs available, giving this machine 12GB of very fast memory at a reasonable price. Kingston > www.kingston.com $380
GRAPHICS	Integrated graphics The ZOTAC motherboard includes the GeForce 9300 chipset, so unless you're gaming, an additional video card isn't necessary. Zotac > www.zotac.com $0	Nvidia GTX 295 You can pick up an Nvidia GTX 295 from the likes of Zotac, Galaxy, Point of View (POV), Palit etc. for around the $600 mark. Nvidia > www.nvidia.com $600	Nvidia GTX 275 Nvidia's CUDA technology should show up in video-editing software soon, and the GTX 275 offers outstanding value for money. Nvidia > www.nvidia.com $275

	HOME-THEATRE PC	MIDGET P55 BEAST	VIDEO-EDITING PC
HDD1	Western Digital WD20EADS 2TB Loads of space for your digital media files, though you'll need to soft mount it to take care of its tendency to vibrate.  Western Digital > www.westerndigital.com $265	G.Skill Falcon 64GB SSD SATAII 2.5in MLC-based SSD based on Indilinx Barefoot design; features a great balance of speed and performance for the cash. G.Skill > www.gskill.com $249	2 x 160GB Intel/Kingston X25-M Offering best-in-class performance, RAIDing these drives will have a massive impact on video-editing performance. Kingston > www.kingston.com $1,400
HDD2	None needed With space at a premium, you're better off with a network drive. N/A	Western Digital Green 2TB WD's latest monster, this time topping the storage scales at 2TB. Perfect as a dump drive for all of your legitimately purchased media. Western Digital > www.westerndigital.com $299	Western Digital ACH-WD2002FYPS 2TB One of the speedier 2TB drives available, using the two drives in RAID 1 ensures data security in case one drive fails. Western Digital > www.westerndigital.com $750
OPTICAL	Pioneer BDC-202BK Blu-ray Pioneer is known for its reliable Blu-ray drives, and this drive is also one of the cheapest on the block. It's nice and quiet as well. Pioneer > www.pioneer.com.au $165	Pioneer DVR218L It doesn't have to be a DVD optical drive, but it helps when making slipstreamed installations with driver and apps pre-installed.  Pioneer Computers > www.pioneer.com.au $60	LG GGW-H20L Blu-ray burner 6x Including this affordable Blu-ray burner allows you to demo your edits in gorgeous HD quality. LG > www.lge.com.au $275
PSU	Antec 430W Fusion Designed specifically for the Fusion case, this PSU is usually included with the case. With no GPU, it's more than powerful enough here. Antec > www.antec.com $0	Corsair HX750 Unlike the rest of the HX series from corsair, the HX750 sports a single 12v rail spitting out a powerful 62A. Corsair > www.corsair.com $225	1000W Antec TPQ-1000W With so many drives and such demanding specs, the reliable 1000W from this PSU is a must. Antec > www.antec.com $280
CASE	Antec Fusion + 430W PSU This gorgeous case won't look out of place, and has a handy LCD to display key media information. It's also very affordable for the quality. Antec > www.antec.com $265	SilverStone SG01-F A wickedly small but capable PC case which can support micro-ATX motherboards and regular-sized ATX PSUs. Silverstone > www.silverstonetek.com $109	Antec Titan Black This massive server tower provides plenty of room for future drive installations, and has decent airflow to keep things cool. Antec > www.antec.com $155
MONITOR	None needed You'll be using a plasma, LCD or projector. $0	BenQ E2200HD Supporting Full HD resolution of 1,920 x 1,080, this offers value and will allow you to test your GPU using the X-preset in 3DMark Vantage. BenQ > www.benq.com.au $235	NEC 2490WUXi Designed specifically for video editing, this monitor is built from the ground up to meet the excruciating demands of editors. NEC > www.nec.com.au $1,500
KEYBOARD	Logitech DiNovo Mini Palm Sized This palm-sized keyboard includes a touchpad for mouse control, as well as backlighting for use in the dark. Logitech > www.logitech.com.au $110	Logitech G15 At $99 the G15 is a solid purchase for any keen gamer looking for a keyboard with an LCD display and macro keys. Logitech > www.logitech.com.au $99	LogicKeyboard PC Line Premiere Designed for users of Adobe Premiere Pro CS4, this company also makes custom keyboards for other editing software. Logitech > www.logitech.com.au $160
MOUSE	N/A The Logitech DiNovo includes a touchpad for mouse duties. N/A	Razer Lachesis Equipped with a 4,000dpi laser sensor, 9 buttons total and symmetrical design; allows equal touch for both lefties and righties. Razer > www.razerzone.com $110	Wacom Intuos3 USB Tablet Real editors don't use mice, they use tablets, and the Wacom line are some of the most popular. Wacom > www.wacom.com.au $745

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4. FUJIFILM FINEPIX F70EXR GUNMETAL

The FinePix F70EXR is FUJIFILM's first long-zoom digital compact camera that comes complete with an impressive 10x wide angle optical zoom. FUJIFILM's award-winning EXR technology will produce crisp, high resolution photographs. Encased in a beautifully crafted metal shell with a double coated lacquer finish, the FinePix F70EXR has been designed specifically for capturing demanding shots in challenging conditions.

PRICE: $499.00 **http://www.fujifilm.com.au/**

5. NERO 9 RELOADED

The holidays are the perfect time to get your multi-media files organised and backed-up! Nero 9 Reloaded allows you to easily create, edit, rip, copy, backup, convert and share your music, videos and photos within your connected digital home, online communities and portable devices. The software is compatible with Windows® 7 and has enhanced AVCHD and PowerPoint features.

PRICE: Download version $101.96, Retail version $199.95

http://www.nero.com/ena/nero9-introduction.html

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MAKE WINDOWS 7 FLAWLESS

Windows 7 is brilliant, but it's a diamond in the rough. **Mike Williams** explains how to polish it.

We're loving Windows 7: it looks great, performs well and is packed with so many small improvements that we'll soon forget Vista ever existed. But at the same time, it's important not to get carried away by the hype. Windows 7 isn't perfect. In fact, it's not even close. Look closely and you'll find it has security problems, interface issues and gaps in functionality, as well as faithfully reproducing common Windows annoyances that have been around for a long time.

Of course, every operating system has its irritations, and you shouldn't let Windows 7's selection put you off upgrading. The key is to understand them. And that's why we've spent weeks with the Windows 7 release candidate, not only uncovering the problems it still contains, but also finding out exactly how to resolve each one. The results will help enhance any Windows 7 installation — so make sure you follow our guide before you do anything else.

1 INSTALLATION ISSUES

Your first problem with Windows 7 will appear before you've even installed it, especially if you're trying to upgrade a version of the Windows 7 beta. Microsoft won't allow this by default, apparently to ensure that the set-up process runs smoothly and no dubious beta code is left behind afterwards. If you're willing to take a risk, though, there is an easy solution that works well for most people.

Take your installation DVD and copy its contents to a folder on your hard drive, or perhaps a bootable flash drive. Open the file 'Sources\cversion.ini' in Notepad and you'll see the line 'MinClient=7100'. This defines the lowest build number that will be accepted for the upgrade. Change this to the build number for your Windows 7 installation — MinClient=7000, say — and then save the file. Now, when you start the setup for your installation, it should work fine.

Unfortunately, you may immediately run into another problem: Windows 7 no longer displays a list of the editions that you can install. So if you currently have the Professional edition, there's no way to switch to anything else during the upgrade — unless you try another tweak, that is.

Return to your custom installation folders, browse to the Sources folder and this time look for the file 'ei.cfg'. Rename this to ei.cfg.old, or edit it and change the [EditionID] value to the version you'd like to install, and the upgrade will run accordingly (see **http://tinyurl.com/myc6gz** for more information).

That's the theory, anyway, although some have reported that this doesn't work for them. And of course you will still need a legitimate product key for your version to be able to activate it.

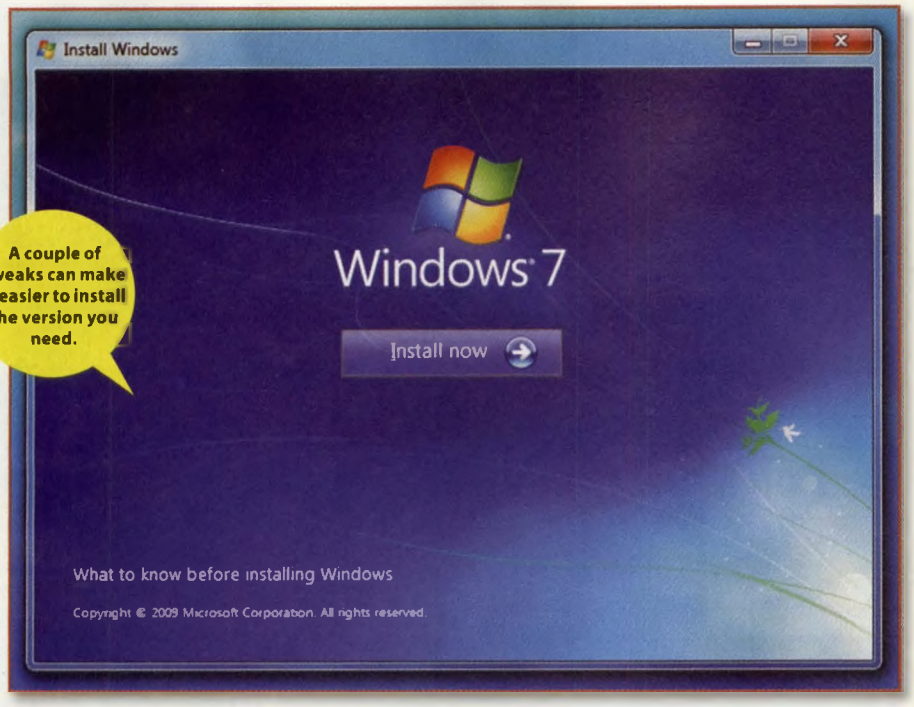
FACT FILE

The Windows RTM 'busy' cursor has a glitch where a frame is repeated, making it appear to stutter. This can be annoying when you know it's there, but fortunately Leo Davidson has used the Vista cursor files to create a solution (**http://tinyurl.com/yhrl6ma**).

2 CUSTOMISING THE INTERFACE

Now Windows 7 is installed and loading for the first time. Unimpressed by the log-in screen? Then try something else. It's fairly easy once you know how. Launch Regedit and browse to 'HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Authentication\LogonUI\Background'. Double-click the dword key called 'OEM Background' (if it's not there just create it) and set its value to 1.

Next, locate the log-in background image you'd like to use. It must be a JPG file that's less than 245KB in size, and it should ideally match


Install Windows
Windows 7
Install now
What to know before installing Windows
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A couple of tweaks can make it easier to install the version you need.

the aspect ratio of your screen, or it'll be stretched to fit.

Drag and drop that image into the '%windir%\system32\oobe\info\backgrounds' folder (if the info or backgrounds folders don't exist then you'll need to create them yourself). Rename it to backgroundDefault.jpg and reboot your PC to check that the log-in screen is now working.

Alternatively, use a free tweaking utility to do all the hard work for you. Logon Changer (**www.tweaks.com/software/tweakslogon**) will resize a copy of your chosen image to ensure it fits, then display a preview so you can see how it looks without restarting. The Logon Screen Rotator (**www.lukepaynesoftware.com/lsr**) lets you choose multiple images and will display a different one each time the log-in screen is displayed.

Once you've finished customising the log-in screen, address your display by downloading a fresh Windows theme. DeviantArt (**www.deviantart.com**), I Think Different (**www.ithinkdiff.com/windows-7-themes**) and Windows 7 Themes (**www.windows7themes.com**) have some excellent examples to help you get started.

3 TWEAKING THE TASKBAR

Start playing with Windows 7 and you'll quickly notice an issue with the new taskbar: it's not always easy to tell at a glance whether an icon represents a running application or a shortcut that's been pinned to the taskbar. If you prefer the more traditional Windows approach to taskbar buttons, right-click the taskbar, select 'Properties' and set taskbar buttons to 'Combine when taskbar is full'. Running programs will now be much easier to spot.

One problem with this is that the buttons will include text labels, which wastes valuable screen real estate. For a cleaner approach, launch Regedit, move to 'HKEY_CURRENT_USER\Control Panel\Desktop\WindowMetrics', add a string called MinWidth and set it to 54. On rebooting your system you'll have icon-only taskbar buttons with no text at all.

You can also use the taskbar to pin shortcuts for frequently used programs by right-clicking an application and selecting 'Pin To Taskbar', but this approach is frustratingly inconsistent. You might want to have the Recycle Bin on your taskbar, for instance, but there's no 'Pin' option on its right-click context menu. The solution here is to find the internal Windows shortcut for the Recycle Bin or whatever other resource you'd like to pin. It can be a tricky process, but Seven Forums has a tutorial to talk you through the process (**http://tinyurl.com/crmr6b**).

WINDOWS 7 TWEAKING TOOLS

CUSTOMISE YOUR SYSTEM FOR FREE WITH THESE WINDOWS 7 UTILITIES.

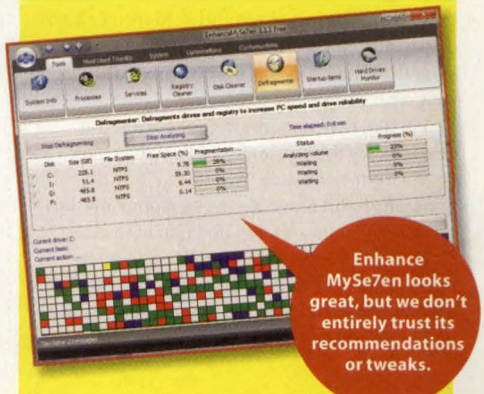
If we've not uncovered an answer for your particular Windows 7 problem then you could always try a Windows 7 tweaking tool. But what can you expect? We took a closer look.

XdN Tweaker (*www.xenomorph.net*) takes common Registry tweaks and makes them accessible at a single click, so for instance you can change the mouse hover timeout for Aero Peek, enable or disable hibernation, change the look of shortcuts, add 'Copy to folder' and 'Move to folder' features to the right-click Explorer menu, and more. There's nothing too ambitious here, but it all works well and the program has plenty of enthusiastic users.

The Ultimate Windows Tweaker (*www.thewindowsclub.com*) is a more substantial effort, cramming more than 150 tweaks into a simple and straightforward interface. It's strong on ways to customise Explorer, the Start menu and your taskbar, can restrict a PC in many ways (you can disable Control Panel, for example) and includes Windows 7-specific features like the ability to enable and disable Aero Shake, Aero Snap and Aero Peek.

EnhanceMySe7en Free (*www.seriousbit.com*) aims to be the complete maintenance toolkit, with modules to manage running processes, services and start-up tools, clean your Registry and hard drive, report on drive health and tweak and optimise many Windows settings. It looks impressive, but should you use it? We've seen reports of users who've had problems with the tool. Avoid it for now.

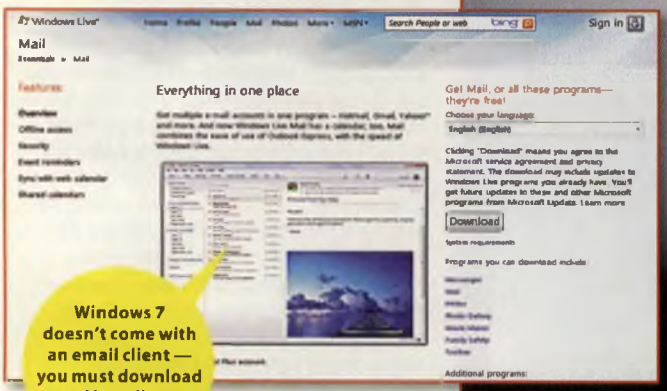
Our verdict? Most tweaking tools are short on Windows 7-specific features, and reliability can also be a problem. We'd recommend you wait for the authors to iron out any bugs, but if you must try one now then the Ultimate Windows Tweaker delivers the best mix.



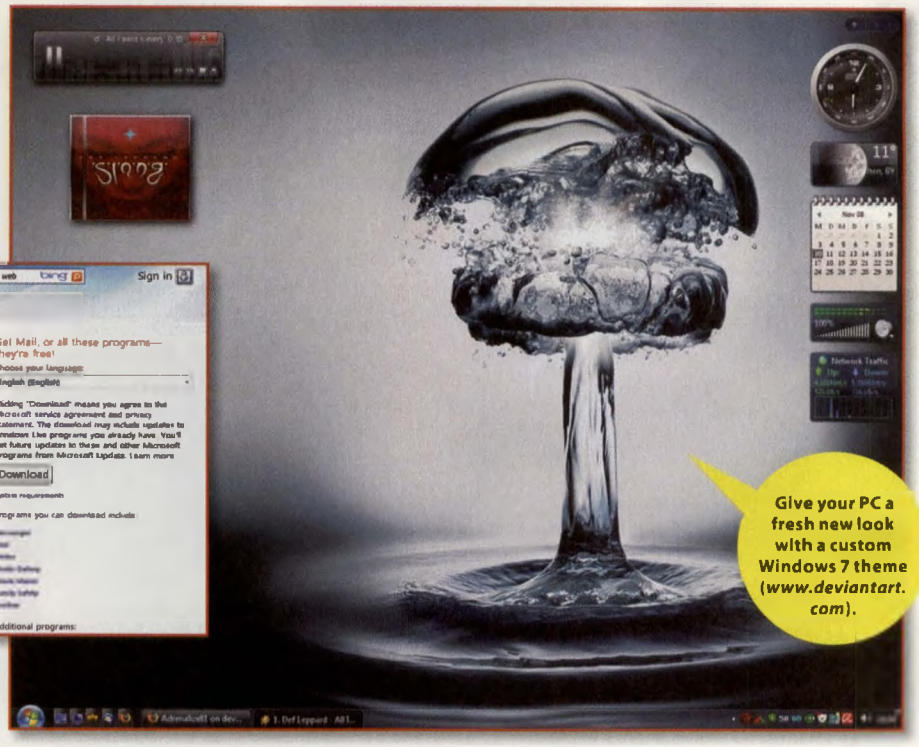
Enhance MySe7en looks great, but we don't entirely trust its recommendations or tweaks.

FACT FILE

Windows Live MovieMaker won't let you import network files by default. Run Regedit, browse to 'HKEY_CURRENT_USER\Software\Microsoft\Windows Live\Movie Maker', add a dword value called AllowNetwork Files and set it to 1 to free yourself from this annoying limitation.



Windows 7 doesn't come with an email client — you must download and install one separately.



Give your PC a fresh new look with a custom Windows 7 theme (*www.deviantart.com*).

Some have decided they prefer the old Quick Launch toolbar, and while that's not present by default it can be easily restored. Right-click an empty part of the taskbar and click 'Toolbars > New Toolbar'. Next, type '%userprofile%\AppData\Roaming\Microsoft\Internet Explorer\Quick Launch' in the folder box and click 'Select Folder'. The Quick Launch toolbar should now appear on your taskbar.

By default the toolbar will use the minimum amount of space, so you'll have to click the arrows to its right to see any icons it contains. To fix this, first right-click the taskbar and select 'Unlock the taskbar'. Dotted lines will appear to its left; these can then be dragged to the left to extend it. Right-click an empty part of the Quick Launch toolbar and clear the 'Show Title' and 'Show Text' options to save a bit of space.

Finally, take a moment to focus on the new look for the system tray, which is over on the right-hand side. Windows 7 has an annoying habit of hiding these icons now, but by way of compensation you can at least rearrange and reorder them. You can even move important icons outside of the tray for a while and then move them back when you no longer need to keep an eye on them.

4 ADDING APPLETS

With interface issues resolved you'll want to take a closer look at Windows 7's applets, a task made harder by the fact that many of them are no longer installed by default. (Bear this in mind before you get too impressed by the reduced hard drive footprint.)

Mail, Movie Maker, Photo Gallery and others are now only available as a part of Windows Live Essentials, and to get any of them you must point your browser at **http://download.live.com**, click 'Download' and follow the on-screen instructions. The installer will then download and set up the programs you've selected. Unfortunately it'll also install components that many people will find unnecessary, but a little extra work will soon clear up your hard drive.

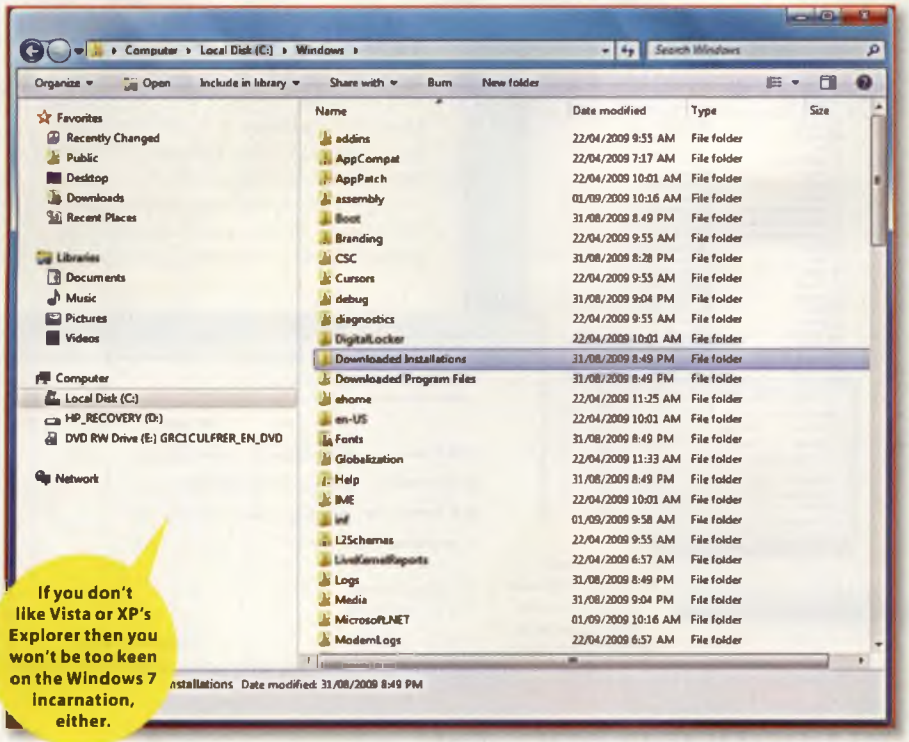
If you left the default 'Set your search provider' option selected, for instance, then Windows Live will install Choice Guard, a tool that sets your browser homepage and search engine and prevents other programs from changing them. If it later gets in the way or you decide that you just don't need it, you can uninstall it by clicking Start, typing 'msiexec /x {F0E12BBA-AD66-4022-A453-A1C8A0C4D570}' and pressing Enter.

You'll also get an ActiveX control to assist in uploading your files to Windows Live SkyDrive, as well as the Windows Live Sign-in Assistant, which makes it easier to switch between multiple Windows Live accounts and synchronises with tools like Live Messenger to ensure it's properly up to date. But if you're sure you'll never want to use these, both can be removed through the Control Panel's Uninstall a Program applet.

If you install Photo Gallery or Movie Maker then Windows Live will also install SQL Server 2005 Compact Edition to manage their databases. If you later remove Photo Gallery and Movie Maker then this can probably go too, but you may break other programs that are using it. If the worst happens, then Jonathan Kay's Messenger Geek blog post showing where the various Live components can be downloaded individually will come in handy [**http://tinyurl.com/mavmom**].

5 CHANGING EXPLORER

The Windows 7 incarnation of Explorer looks a little different, and some of its behaviour seems odd too. Double-click on the Computer folder, for instance, and you'll find that the left-hand



If you don't like Vista or XP's Explorer then you won't be too keen on the Windows 7 incarnation, either.

pane no longer displays system folders like Control Panel or Recycle Bin. And if you're double-clicking your way down through folders in the right-hand pane, the left-hand tree won't always expand to follow what you're doing. This can leave you in the odd position of being unable to see the full folder structure in either pane without expanding it manually, which seems like a step backward to us. Fortunately both problems are easily solved: click 'Organize > Folder and Search Options', check both the 'Show all folders' and the 'Automatically expand to current folder' tickboxes and click 'OK'.

The drive display may also prove a little disconcerting, as by default Windows 7 now hides drives that are empty (including CD, DVD, floppy and memory card), so you can no longer rely on a drive's position in the list to tell what it is. You can turn this feature off by clicking 'Tools > Folder Options > View' and clearing the 'Hide empty drives in the Computer folder' box. If you prefer not to display empty drives, then keep in mind that the setting is overridden by the 'Show all folders' option we've mentioned. If that option is enabled then your empty memory card drive will be displayed, however you've configured the view settings.

Once you've got Explorer set up the way you'd like then there are some interesting new options, though they are a little hidden. If you hold down 'Shift' when right-clicking a file, for example, then you'll find that the Send To menu now lists all the main user folders: Contacts, Downloads, Documents, Music and more. Choose any of these and your file will be moved there immediately.

And if you're going to be working on a folder regularly, open it in the right-hand pane, right-click 'Favourites' over on the left and select 'Add to Favourites'. It'll then appear at the bottom of the current list, making it very easy to access the folder later on.

If all this seems too much like just tinkering around the edges without really solving anything, you might prefer to replace Explorer entirely. In this case, Xplorer2 lite (**www.zabkat.com/x2lite.htm**) is the perfect candidate. It has the familiar look of older versions of Explorer, yet it also includes a dual-pane view, tabs, a bulk file-renaming tool, the ability to select files using filters (c*.jpg, a*.png, for example), full shell integration and a whole lot more. It works well on Windows 7 and is free for personal use. It's well worth

LOCK DOWN UAC

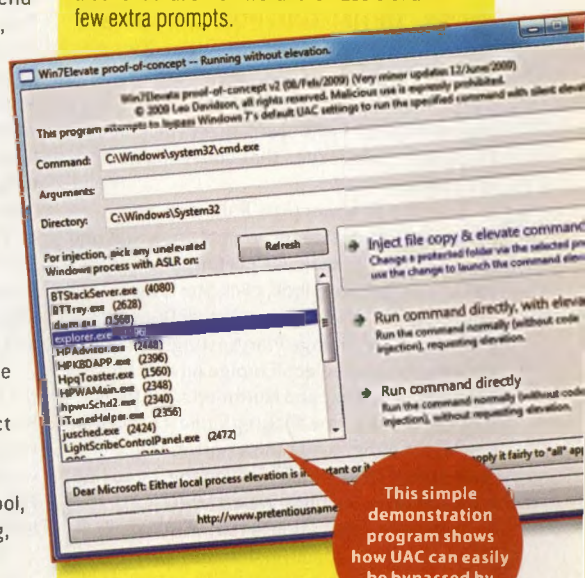
UNFORTUNATELY, THE HASSLE-FREE NEW DEFAULT SETTING IS A MAJOR SECURITY RISK.

Upgrading to Windows 7 from Vista will immediately set your UAC protection level to the new, quieter default: 'Notify me only when programs try to make changes to my computer — don't notify me when I make changes to Windows settings'.

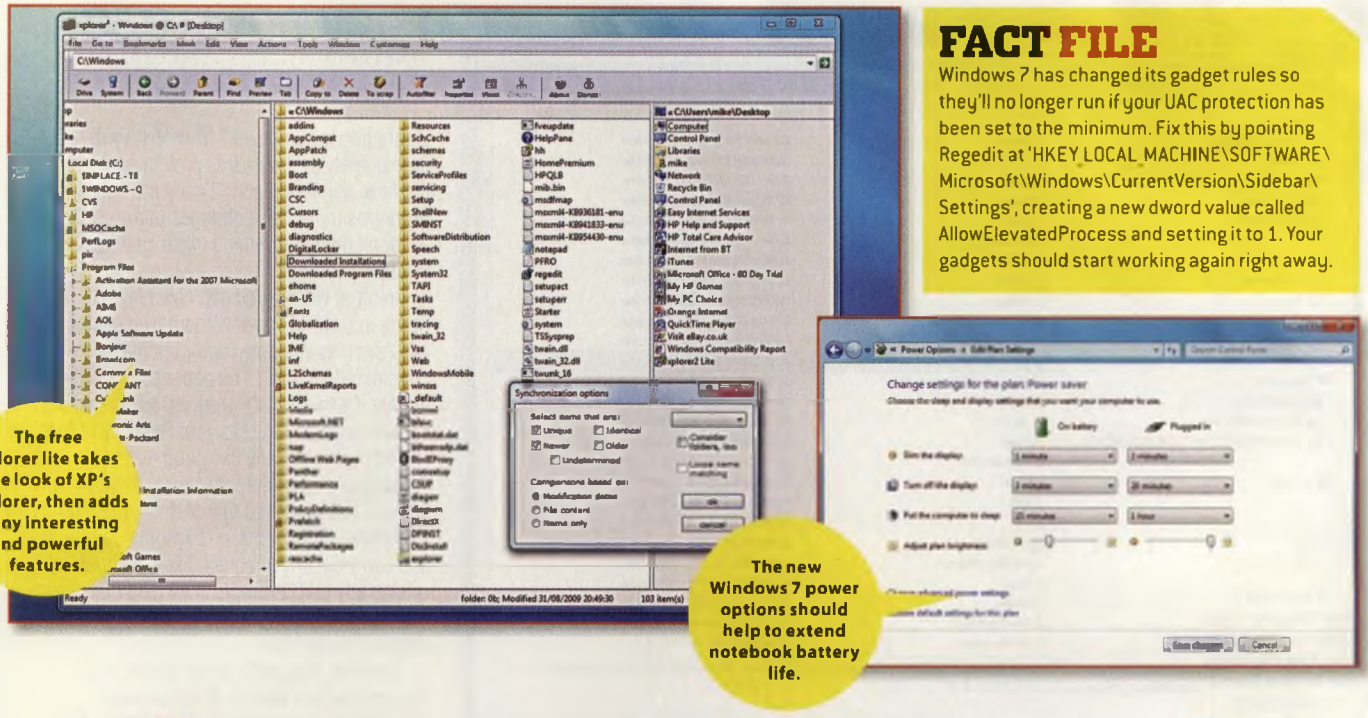
In other words, you can now play around for hours in Control Panel without ever seeing a UAC alert, as Windows components are considered 'trusted'. The pop-ups will only appear if a third-party program starts making system-level changes to your Registry or files.

While this sounds like good news, it's actually a real problem, because malware can easily inject code into one of those trusted Windows components — Explorer, say — and carry out any actions it likes, without raising any UAC prompts at all (see *http://tinyurl.com/byuv4v* for a program demonstrating this).

The new UAC setting leaves you less secure than you were in Vista, so we'd recommend you change it immediately. Click Start, type UAC and click the 'Change User Account Control settings' link, then move to the security slider to its highest setting ('Always notify') and click 'OK'. Basic code injection tricks will then no longer be enough for malware to operate undercover, a benefit that's well worth the hassle of a few extra prompts.



This simple demonstration program shows how UAC can easily be bypassed by malware.


The free Xplorer lite takes the look of XP's Explorer, then adds many interesting and powerful features.
The new Windows 7 power options should help to extend notebook battery life.

FACT FILE

Windows 7 has changed its gadget rules so they'll no longer run if your UAC protection has been set to the minimum. Fix this by pointing Regedit at 'HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Sidebar\Settings', creating a new dword value called AllowElevatedProcess and setting it to 1. Your gadgets should start working again right away.

YOU SHOULD SEE AN IMPROVEMENT IN BATTERY LIFE

a look if the Windows 7 (or Vista, or XP) Explorer doesn't suit your needs.

6 OPTIMISING POWER PLANS

The new, greener Windows 7 is generally a good thing, especially for notebooks where you should see an improvement in battery life. However, it does come with some issues that you really need to know about.

The default power plan 'Balanced', for instance, includes some new settings that you can use to either optimise performance or power use. To take a look, click Start, type Power Options and click the 'Power Options' link, then click 'Change Plan Settings' for your current plan and select 'Change Advanced Settings'. If you expand Multimedia Settings, say, you'll see a new 'Playing video' option that can be set either to optimise performance or save power. Have a look through the list to find out what other settings are on offer.

Another complication is that Windows 7 makes it even more difficult to turn off hibernation, which is annoying if you never use Sleep, as the hibernation file will permanently occupy a chunk of your hard drive. To free this up, launch Regedit, browse to 'HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Power' and set both 'HibernateEnabled' and 'HiberFileSizePerfect' to 0.

If you do use Sleep then you should pay attention to the 'HiberFileSizePercent' value, which tells Windows 7 how large you'd like the hibernation file to be as a proportion of your total RAM. The default value is 75 per cent. This means that if you're lucky enough to have a 64-bit PC with 16GB of RAM, you'll be using up 12GB. Reducing the HiberFileSize Percent value should give you two benefits: you'll save hard disk space, and Windows should go to sleep and wake up more quickly.

This seems a risky strategy, though. If the HiberFileSizePercent value is lower than Windows needs then we found that our PC would display a blue-screen error whenever we tried to hibernate. To be safe, set HiberFileSizePercent to 100 (decimal) and leave it there.

There are some suggestions that Windows 7 isn't as kind as expected to notebook battery life, though. If you have problems, open an elevated command prompt and type POWERCFG -ENERGY to get a report that may explain why.

7 TWEAKING ERROR HANDLING

There are two schools of thought on the dump files left behind by blue-screen Windows crashes. A few people like to keep as many files as possible so that they can analyse the cause of crashes later with a debugger, while the rest of the world couldn't care less about crash dump files.

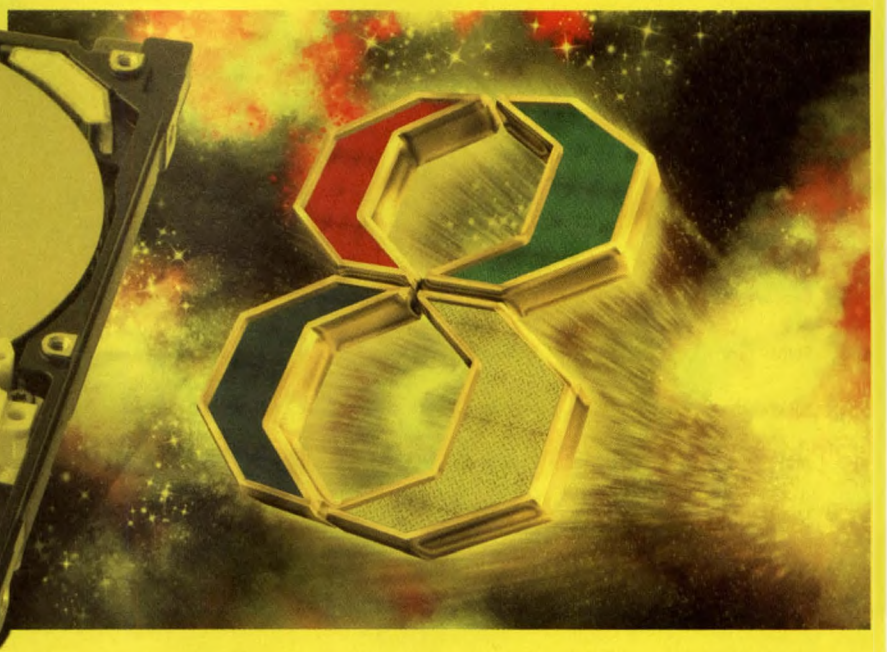
The Windows 7 development team knew this, but somehow they still managed to choose default settings that will annoy both groups. There's no way to fix the problem in the interface, either, so you'll need to launch Regedit in order to get Windows working as you'd expect.

If you like to analyse dump files, you might be puzzled why the last 'memory.dmp' file doesn't always appear on your system. What's going on? It turns out Windows won't store the dump file for PCs not on a domain if they have less than 25GB of free hard drive space. To fix this, browse to 'HKEY_LOCAL_MACHINE\

WINDOWS 8 WISH LIST

WHERE SHOULD MICROSOFT GO FROM HERE?

The venerable NTFS filesystem, which decides how data is stored on the hard disk, is ripe for a major upgrade.



SYSTEM\CurrentControlSet\Control\CrashControl', create a new dword value called AlwaysKeep MemoryDump and set it to 1. The file will now always be saved.

If you're in the much larger group that thinks crash dump files are a waste of your hard drive space, you'll be unimpressed to learn that Windows 7 now keeps the last 50 minidumps by default. Again, browse to 'HKEY LOCAL MACHINE\SYSTEM\CurrentControlSet\Control\CrashControl' in Regedit, set 'MiniDumpsCount' to 1 (not 0 — there's always the chance that you'll need to look at the last error) and you'll free up a little drive space.

It's not all bad news, though — the new Control Panel applet Troubleshooting is the start of a technology that will make it much easier to track down and fix any problems. If your installation is misbehaving then give it a try and see what you can uncover.

REPLACING XP MODE

Windows 7 contains a compatibility mode in case your installation won't run older software, just as with XP and Vista. Right-click the application shortcut, click

Windows 7 is a big step forward from XP and Vista, but there are plenty of issues that it leaves untouched. If I were in charge of producing Windows 8 then these would be the areas I'd want to address first.

NTFS has served us well, but it's time for a new filesystem. Moving to something like ZFS (*http://tinyurl.com/zzrhj*), for example, would give us pooled storage. No more nonsense over partitions and volumes, just add two 750GB drives and automatically get a 1.5TB pool. Error checking is excellent, snapshots automatically create incremental backups, there's no arbitrary limits over file sizes, links, directory entries or whatever and it's very fast.

Windows Explorer needs major attention, too. At a minimum, let's fix the basics: we really shouldn't still be wondering why the program forgets our folder settings at random moments, say (or dumping the option entirely as appears to be the case with Windows 7). Better still, I'd research dual-panel and tabbed browsing interfaces to deliver easier file management.

AND ANOTHER THING

The Registry has become a real annoyance. Apps that use it are often very difficult to migrate from one PC to another, and Registry corruption can have all kinds of disastrous effects. It's time to find alternatives that will provide similar uniform access and ease of use for developers but not tie their data to a single set of files. Especially ones that Microsoft says are too dangerous for most users to access, just in case they make a mistake.

It's obvious by now that no-one's ever going to agree on the best way to arrange the taskbar and Start menu. So let's have a version that doesn't change anything for the sake of it but allows users to customise all aspects of the interface for themselves (fonts, button sizes, border widths and more), while also making the available options more consistent (if I want to pin a folder directly to the taskbar, then I should be able to do exactly that).

With that all sorted, I'd aim to produce a more configurable Control Panel where it's easy to display just the applets that you commonly use; simplify network troubleshooting; add encryption to Windows 8 Home Premium because regular users need security, too; and discover why Windows is slow at copying, and then fix the problem. That's not too much to ask... is it?

'Properties > Compatibility', check 'Run this program in Compatibility mode' and choose a version of the operating system where the application should work. If that doesn't help, then you could try XP Mode, which is an installation of XP that will run in a window on the Windows 7 desktop. However, this is only included with Ultimate, Professional and Enterprise, and your CPU must support hardware virtualisation (AMD-V or Intel VT).

The second issue is proving a major concern for owners of certain notebook models, who've discovered that hardware virtualisation has been disabled on their system. Sony has said that it removed the option from Vaio systems over security concerns (we've no idea what), and owners of Acer notebooks have also reported problems.

One potential solution has appeared, but it's for the brave only, as you'll need to manually tweak your notebook firmware, and if this goes wrong then it may never boot again. Point your browser at **http://feature-enable.blogspot.com** if you'd like to give it a try.

A better idea might be to simply use another virtualisation package instead. VirtualBox (**www.virtualbox.org**) and VMware Server (**www.vmware.com/products/server**) are the best free offerings, and neither insist on explicit BIOS support. This won't get you a licensed version of XP, but if you don't have one then check eBay — you should be able to pick one up cheap.

9 TUNING PERFORMANCE

With your Windows 7 installation now mostly whipped into shape, you can finish things off by applying a few more familiar performance tweaks. Windows 7 services are well optimised, but there are still a few things you can do. Launch 'services.msc', and set the start-up type of services you don't need to 'Disabled'. The Distributed Link Tracking Client and Windows Media Player Network Sharing Service are two obvious candidates, assuming you don't require either.

Also look for any non-critical third-party services like Apple Mobile Device and set them to 'Delayed Start' in order to help improve your boot time. (Just don't try that with something important like your antivirus service.)

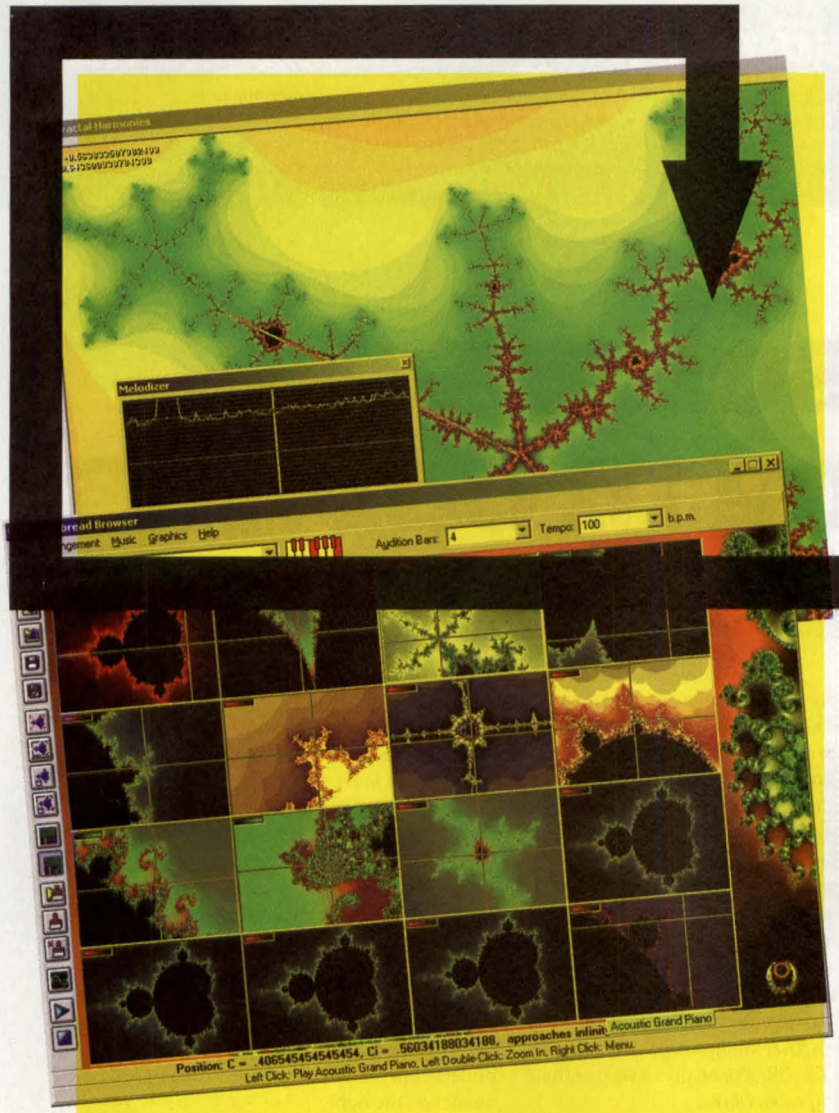
It's even more important to keep track of other software that's launched when your PC boots. Unfortunately, Windows 7 has made that more difficult by removing the Software Explorer element of Windows Defender. Download and run a copy of AutoRuns instead (**http://tinyurl.com/39338j**) and it'll let you know exactly what things are running on your system.

Windows 7 is supposed to have sorted out the TCP autotuning issues that occasionally crippled Vista's internet and networking performance, but early reports say that they can still crop up. To disable autotuning, click Start, type cmd.exe, right-click the 'cmd.exe' link and select 'Run as Administrator'. Next, enter the command 'netsh int tcp set global autotuninglevel=disabled' and press 'Enter', then reboot and try again. If it makes no difference then use 'netsh int tcp set global autotuninglevel=normal' to restore default settings.

Keep in mind, though, that many problems to do with both reliability and performance will be due to you running generic or very early drivers. New versions for Windows 7 should be appearing quickly and often, so check your manufacturer's support sites regularly for advice. Better still, install a dedicated tool like DriverMax (**www.innovative-sol.com/drivermax**) to do it for you automatically: the program is free and fast, and using it to uncover and install the latest drivers should quickly have your Windows 7 installation running at its best. APC

85 howto

PROJECTS, TIPS AND TRICKS


Melodizer
Audition Bars: 4
Tempo: 100 b.p.m.
Position: C = -.405545454545454, Ci = .5603418803418, approaches infinity
Left Click: Play Acoustic Grand Piano, Left Double-Click: Zoom In, Right Click: Menu.
Acoustic Grand Piano

WORKSHOP

HOW TO MAKE MUSIC FROM NUMBERS

Continuing our exploration of fractals, Mike Bedford applies mathematical equations to melody.

94

QUICK TIPS

Tech tips plus reader questions and answers 86

INSIDER TIPS

Transform your media experience 89
Real-world lessons 90
Boost your iPhone's battery life 91

OS CHALLENGE

The good drop 92

WORKSHOPS

Make music from numbers 94
Create your own platform game 97
Create long exposure images 100

MASTERCLASS

Affiliate marketing 103
Protecting your home network 106

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INTERNET

INTERNET PREVIEW URLs

Q So many web sites now make use of TinyURL, bit.ly or other URL shortening services to link to lengthy web addresses, but I'm concerned about the potential security risks. There's generally no way to see what site is being linked to, and there is always the outside possibility that the destination site may be malicious. I'm aware that when producing a shortened URL, the creator can make use of a preview page, but few people seem to take advantage of this. Is there any way to decode a shortened URL before visiting the related site?

Clive Hollywood

A The previewing option you mention is not something that the link creator has to manually select. For instance, we created a TinyURL address that points to the *APC* web site: **tinyurl.com/5ao2sr**.

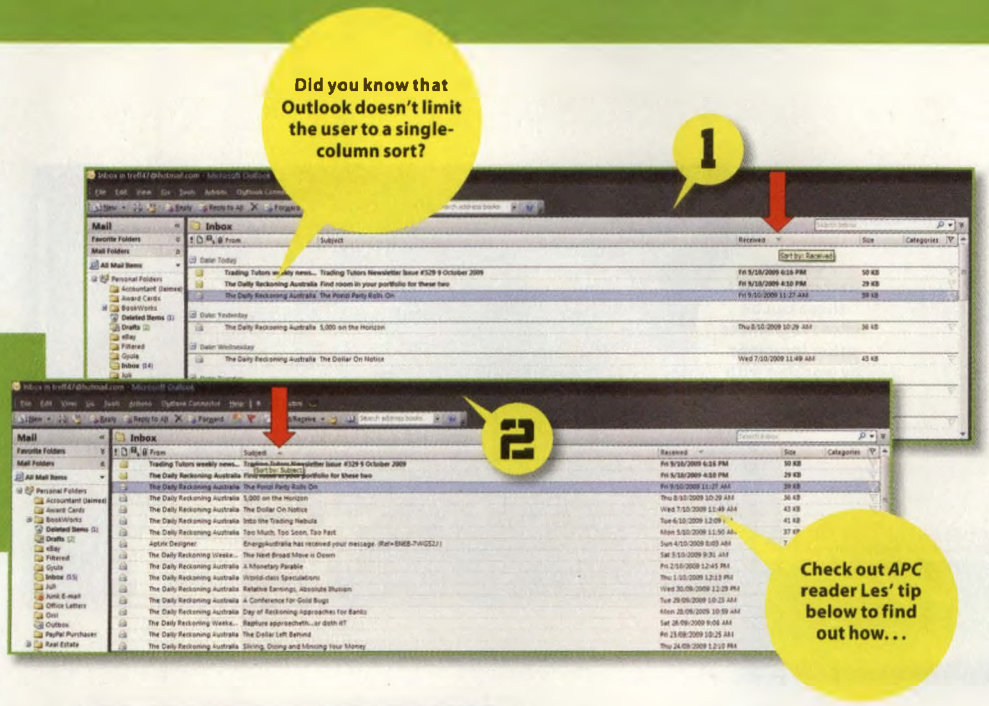
By changing the address to **http://preview.tinyurl.com/5ao2sr** you can view details of the full address before deciding whether or not to proceed. The insertion of 'preview.' into any TinyURL allows the site to be previewed, regardless of whether the creator has opted to share the direct link. But this extra address adjustment step is something that's all too easily forgotten; thankfully it is possible to force all shortened TinyURLs to be previewed without the need for any extra work.

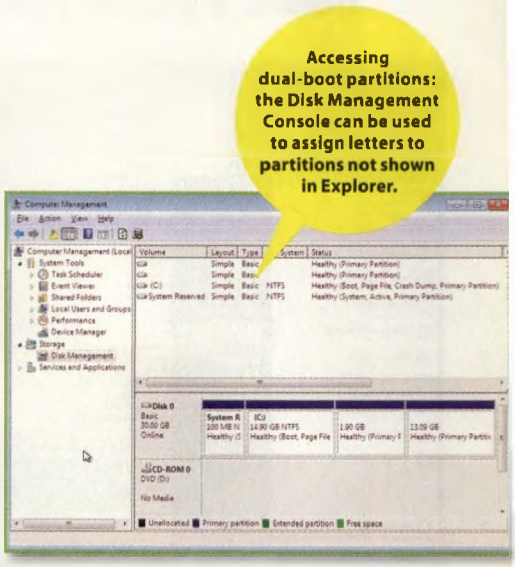
To configure this feature, pay a visit to **www.tinyurl.com/preview.php** and click the 'Click here to enable previews' link — you'll need to ensure that cookies are enabled. Now, whenever you click a TinyURL the full web site address will be displayed, giving you the option of changing your mind if the link looks untrustworthy. This second method is best suited to your personal computer, but the technique of adding 'preview.' to an address can be used on other machines, which may not have cookies enabled.

If you often view bit.ly links, you can install a Firefox plug-in that will enable previews. To do so just visit **www.bit.ly** and click the 'Install' link underneath the 'Preview Plug-in for Firefox' header on the right.

AND THE WINNER IS: LES GARAM

Whether you are a digital photography nut, into designing avatars or need a more intuitive way to mark up documents, the Bamboo Fun tablet from Wacom is for you. It uses a pressure-sensitive pen to navigate, draw, write, retouch, and paint. Adobe Photoshop Elements and Corel Painter Essentials come bundled for beginners, while confident users will find the Bamboo Fun unlocks the advanced pressure-sensitive features in their favourite applications. RRP: $299 (Bamboo Fun Medium). Available from **www.wacom.com.au**. Les Garam from Frenchs Forest, Sydney, provided the Outlook sorting tip.


Did you know that Outlook doesn't limit the user to a single-column sort?
1
2
Check out APC reader Les' tip below to find out how...


Accessing dual-boot partitions: the Disk Management Console can be used to assign letters to partitions not shown in Explorer.

WINDOWS

CHANGE START LINKS

Q I'm using Vista, and when I click Start, links to various folders are displayed in the upper right of the menu. I'd like to change the 'Games' entry to point to something useful, such as Downloads. Can this be done?

Clive Jones

A Edit the Registry to do this. Press [Windows]+[R], type regedit and press [Enter] before navigating to 'HKEY_CURRENT_USER\Software\Classes\CLSID\'. With this key selected, click 'Edit > New > Key' and create a new key called {ED228FDF-9EA8-4870-83b1-96b02CFE0D52}. Select this new key and use the same process to create three new subkeys: one called DefaultIcon, one called InProcserver32 and another called shell. In the right-hand pane, select the value named '(Default)' and change its value to Downloads. Select the DefaultIcon key and change the value of the default string to imageres.dll,-184. Select the InProcserver32 key and change the value of the default string to shell32.dll. Now select the shell key and select 'Edit > New > Key' before typing open and pressing [Enter]. Select this new key, click 'Edit > New > Key', type command and tap [Enter]. With the command key selected, change the value of the default string to explorer.exe shell:Downloads and close down the Registry editor. After restarting, a new entry should appear in the Start menu.

WINDOWS 7

SET EXPLORER'S DEFAULT FOLDER

Q I've upgraded to Windows 7 and want to customise the folder displayed when launching Explorer from the taskbar. As it stands, Windows displays 'Libraries'. I'd prefer to stick with the standard folder option. Can I customise the shortcut so a specific folder is displayed to save me having to navigate to it?

Clive Honeywell

A Right-click the Explorer shortcut in the taskbar, then right-click Windows Explorer in the jump list displayed. Select 'Properties' and move to the 'Target' field. To jump to a specific folder, enter explorer.exe c:\Path\To The\Folder before clicking 'OK'. You can also jump to non-standard folder locations such as Computer (explorer.exe ::{20D04FE0-3AEA-1069-A2D8-08002B30309D}) and Documents (explorer.exe ::{450D8FBA-AD25-11D0-98A8-0800361B1103}).

WINDOWS 7

DUAL-BOOT PARTITIONS

Q Since upgrading from Vista to Win 7 and setting things up as a dual-boot system, I find that when booting into Windows 7 my Vista partition is not visible. All partitions are accessible in Vista. How do I fix this?

Walter Jacobs

A In Windows 7 click the Start orb, type diskmgmt.msc and press [Enter]. Right-click the partition that contains Vista and select 'Change Drive Letter and Paths' before clicking 'Add'. After choosing a drive letter, the partition should be accessible from Explorer.

READER TIP

BETTER OUTLOOK SORTING

Reader Les Garam has a great tip for people who need to sort Outlook content: "It is well known that one can sort Outlook items by clicking a column title. Clicking toggles between ascending and descending order. However, it's less known that Outlook doesn't limit the user to a single-column sort. To sort two columns simultaneously, sort the primary column first. A small up arrow will indicate an ascending/descending sort on the selected column. In this case, it is the "Received" column as shown above.

1 "While holding down the [Shift] key, click the column that represents the secondary sort. In this case it is the "Subject" column. Note the presence of the small arrow in the "Received" column as well as in the "Subject" column.

2 "To undo the result, single-click any column. It also works with Windows Explorer in Windows 7, sorting for example on file type and file size. You can [Shift] and click the second sort multiple times to toggle the ascending/descending sort direction."

Les works as a technical illustrator for a publishing company and has used computers since the late '80, starting with the magic Amiga.

OUTLOOK

VIEW MORE IN OUTLOOK

Q I use the calendar function of Outlook 2007, but I can't see more than three appointments on one day in Month view. I have to switch to the Week or Day view to see more. Can this be avoided?

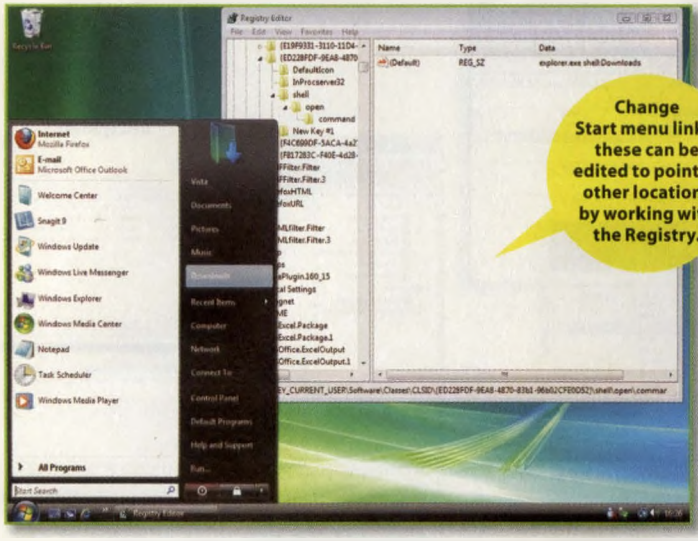
Samuel Turner

A First, lose the status bar by unticking the 'Status Bar' option in the View menu. Next, make the boxes larger by viewing only a couple of weeks' worth of appointments at a time — use the mini calendar in the left-hand Navigation pane to select the dates. The selected view won't be saved between sessions, however.

TORRENTS

SAFE BITTORRENT USE

Q I often download ISO files of operating systems I find reported on at Distro Watch (**www.distrowatch.com**) using



BitTorrent. I'm worried about unknown PCs getting access to mine and also the possibility of being mistakenly flagged by my ISP as a pirate. What can I do to protect my privacy when using BitTorrent?

Andrew Simmons

A BitTorrent is the protocol used to distribute a download across multiple computers, each sharing the file with one another to prevent any one connection being hit hard for the bandwidth used. There are various different client programs that you can use, some of which contain privacy features. However, the whole point of the system is to enable other computers to have access to specific files on yours so that you contribute to the overall bandwidth use. If you're at all uncomfortable with this idea, it may not be the best system to use.

Many major distributions of Linux and BSD provide download links that work in a traditional manner. Assuming you have a decent firewall, using one of these links will ensure that unknown PCs can't access yours, but you'll be adding to the costs of the file's host.

The chances of being labelled a pirate when downloading legitimate content are slim, but BitTorrent and other peer-to-peer systems are often restricted or blocked by ISPs due to bandwidth costs and because copyrighted content is often shared in this way. However, if you're concerned about this, there are ways that you can prevent others from monitoring your download details.

Encryption enables you to scramble the data that you're downloading so that only people with direct access to the torrent file can see what's being downloaded. The client uTorrent supports encryption. To turn it on, select 'Options > Preferences > BitTorrent' and change the 'Outgoing Protocol Encryption' setting to 'Forced'. This ensures that encryption is in operation by refusing peers that don't use it. However, this reduces the download speed because it restricts the number of peers that you can use, and it's not really that secure, as anyone wanting to snoop on your download could just switch to using the encrypted service.

A more effective option is PeerBlock. This is a specialised firewall that blocks access to your PC from specified IP addresses. If you keep its list of unsafe IP addresses up to date, you greatly reduce the chances that a malicious organisation can access your PC. PeerBlock was developed from the earlier program PeerGuardian, which has dropped out of continuous development. It's known to work under Windows 7. When you install the program, you can select which privacy lists you want to use and how frequently you'd like to check for updates. If you accept the default option to block HTTP connections from flagged organisations, you won't be able to access their web pages unless you temporarily enable HTTP to do so.

The Vuze client, formerly Azureus (**http://azureus.sourceforge.net**), enables you to use IP address block lists too. Choose 'Tools > Options > IP Filters' and browse to the filter file you want to use, such as a PeerGuardian file or a text list of IP addresses. Click 'Load Now' to use.

You can also subscribe to a proxy server that routes all traffic to and from your PC, effectively giving you a different IP address. Services like BT Guard (**www.btguard.com**) let you use their servers to hide your PC. uTorrent also supports using a proxy. In Vuze, enable Advanced mode, choose 'Tools > Options > Connection > Proxy Options' and enter the server details. If you use a proxy, remember it could be used to store details of everything downloaded through it.

89 insider tips

HOW THE PROFESSIONALS DO IT

IN THIS ISSUE

89 Transform your media experience 90 Real-world lessons
91 Boost you iPhone's battery life 92 The good drop

WINDOWS VIEW

Transform your media experience

If you're looking at setting up a PC-based home entertainment system, then Windows 7 has some excellent features in store.

APC EXPERT

JAMES BANNAN

James Bannan is a systems manager at St Leonard's College (Vic) and *APC*'s resident Windows expert.

Since Media Center was first released with Windows XP, apart from hotfixes and patches it hasn't really changed that much throughout successive service packs and new versions of Windows. Media Center in Windows 7 doesn't look that different from its predecessors, but the under-the-hood enhancements are significant.

Windows 7 will handle up to four TV tuners of different makes and models for simultaneous recording/playback (you'll need some fast storage to handle that — especially for HD streams) and you can prioritise certain stations to specific tuners. It also brings in reliable Electronic Program Guide (EPG) data over the free-to-air stations so you no longer need to use a subscription service like IceTV, and when you hit the Mute button on a TV stream (live or recorded) the close captioning automatically appears on screen. Although Windows 7 has native support for Blu-ray data discs, it can't play back Blu-ray movies without a third-party application. CyberLink PowerDVD 9.0 Ultra is an excellent, although expensive, choice as it fully integrates with the Media Center UI and does a much better job than previous versions of the product.

Windows 7 supports a wide range of digital video and audio formats — far more than Vista — but there are still some holes to be filled. For example, it won't play some proprietary formats like Apple QuickTime MOV or Matroska-encoded H.264 MKV videos or FLAC audio files. You can download and install each package, which will provide support for each media type, but the best course of action is to download and install Shark007's codec packs for Windows 7 (**http://shark007.net**). This will enable support for a large range of natively unsupported digital media for playback within Windows Media Player, and by extension Media Center. Unlike many other codec packs it doesn't override native codec support — merely fills in the gaps and provides an alternative to native codecs if preferred. It's stable and regularly updated, and there are versions for both 32-bit and 64-bit platforms.

To enable playback of a natively unsupported file type you need to create a file association, otherwise even with the right codec Windows won't play the file. The easiest way is to double-click the file and when presented with the option to choose an application, select Media Player as the default. This creates a file association for that file type to WMP in the registry, which will also work in Media Center.

With a media centre running Windows 7 you can also hook in to a wide range of very cool add-ons, like online media streaming via your Windows Live account, streaming to other local Windows 7 systems and Xbox 360 consoles, HomeGroup library integration and full support for Windows Home Server (with the Power Pack 3 update).

Finally, if you really want to get your geek on, install Games for Windows Live on the media centre and hook up an Xbox PC controller to turn the system into a loungeroom gaming rig, and for true retro glory, grab an add-on like GameEx, which will turn the Media Center UI into a front end for arcade emulation games like MAME.

Feel like a little downtime? Windows 7 has you covered.
My Videos | Movies
5:14 AM
Harry Potter and the Order of the Phoenix
6 | 22

LINUX WINDOW

Real-world lessons

Imagine for a second that you've never used or seen Linux before — what would you make of it?

APC EXPERT

ASHTON MILLS

Editor of the Linux Pocketbooks series, and now with CHOICE magazine, Ashton has been a tech journo for over 13 years, including five years with *APC*.

It's easy to forget what it's like for the non-geeks in our lives. And by geeks I don't just mean the bearded hardcore Linux uber-gurus, but just average technically aware people like you and I.

Linux has come a long way on the desktop, so much so in fact it's no more hard or more easy to use than Windows. It's not quite a one-for-one comparison — Linux still does some things better than Windows, and Windows does some things better than Linux.

And this was no more apparent than when I built a new PC for my partner and handed over a dual-boot Windows Vista and Ubuntu Linux machine. I genuinely wanted her to have the best experience using her PC, but I thought I'd leave it up to her to decide what that was, so I gave her the option. "Vista is on there," I said, "but if you want to try something different, Ubuntu is on there too. Just select it from the boot menu."

And she did. Some time later I asked her how it was going, and she replied she had given "this Linux thing" a try and really liked it. It was faster than Vista, she reported, seemed to run less junk in the background, and kept her wireless connection active whereas Vista seemed to keep dropping it.

The only piece of advice I had given her was that if she wanted to install applications, to first explore the Add/Remove programs feature in Ubuntu. She had been using this and thought it was fantastic — "There are thousands of programs in there and I don't have to scour the web to find them!"

"And what don't you like about it?" I asked. I know the faults I find in Linux, but what ones would she see?

She had a hard time trying to find drivers for some of her devices. I then had to explain that with Linux, with few exceptions like the Nvidia drivers, all the drivers she'll ever need come bundled with the kernel, so you don't need to go searching for them. I think this is a fascinating observation: in Windows we are conditioned to go digging up drivers from manufacturer's web sites, but this isn't a pastime required for Linux.

To which she nodded and then asked "What's a kernel?" I had already delved one level too deep. She was also confused about why an icon wasn't added to the desktop when she installed a program. She told me how she had installed Google Picasa four times before realising the first time worked, but there was no visual indication on the desktop of how to run it.

Finally, there was the one hurdle Linux couldn't overcome: it can't run Windows programs (yes we know it can through WINE et al, but remember this is an out-of-box experience with Ubuntu). She was frustrated some of her favourite programs under Windows couldn't be found under Linux. I explained there were almost always equivalent applications under Linux. This may be, she pointed out, but they are all called something different to their Windows counterparts, so how do you know what Linux program is supposed to be like a particular Windows one? Fairly, many Linux program names have little to do with their task.

We may not want Linux to be Windows, but it's common sense that Linux growth doesn't come from some mystical pool of virginal computer users. It comes from people who are Windows users, because that's what the world uses when it's not using Linux or Mac OS X.

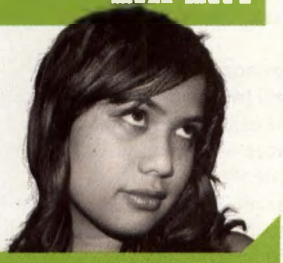
So if you're a Linux geek (uber or otherwise), remember the way you relate to Linux may not be how others do, and that if Linux is to grow we need to build it not for us, but for them. APC

IPHONE

Boost your iPhone's battery life

It cooks, it cleans and it gets along with your mother, but can it last a full day between charges?

APC EXPERT



JENNETH ORANTIA

An expert on all things mobile, Jenneth Orantia has been writing reviews and tutorials on smartphones for the last seven years. Her current phone of choice is the iPhone 3G, but she's also well-versed in Windows Mobile, Symbian, Palm and BlackBerry.

Since the iPhone's inception, Apple has steadily added feature after impressive feature with each successive generation, but the one sticking point that's persisted between models is the lacklustre battery life. Put plainly, it stinks, and it's not uncommon to get a low battery warning within a couple of hours of taking the iPhone off charge — even when you haven't actually been using it!

The iPhone's limited stamina has spawned a whole collection of extended battery options, but you don't need to buy yet another accessory just to get enough battery life to last you the day (although they're always good as a backup option). The iPhone has a number of features that you can turn on and off as needed, and knowing where to find them in a pinch will save your bacon the next time the battery's on its last legs and you need to make a phone call or quickly look up an address or phone number.

TURN OFF WIRELESS CONNECTIVITY

Wi-Fi and Bluetooth aren't the sort of features you need all the time, so making it a habit of turning them off when you're not using them can make a difference — especially for Wi-Fi, which is notorious for using up power. The option for Wi-Fi can be found in the root menu in Settings, while Bluetooth can be found in 'Settings > General > Bluetooth'.

Turning 3G off when you're not using it will give you a marked boost in battery life. You'll still be able to make calls and access the internet, but your browsing speeds will be at the slower GPRS speeds — not a bad trade-off for adding a couple of extra hours to your iPhone's run-time. To switch to 2.5G, go to 'Settings > General > Network' and tap the 'Enable 3G' option so it says 'Off'.

TURN OFF PUSH EMAIL

One of the perks of the iPhone is that it offers push email for free with services like Gmail and Yahoo! Mail — the only problem is that having your email set to push is yet another major power sucker.

The best option is to turn push email off when you need the longer battery life; to do this, go to 'Settings > Mail, Contacts, Calendars' and tap on 'Fetch New Data'. Tap on the Push option so it displays 'Off', and select 'Manually' under Fetch. The latter option means that your iPhone will only check for new email when you launch the Mail program.

MINIMISE SCREEN USAGE

As lovely and multi-touch-y as the iPhone's screen is, it's the single biggest battery hog out of everything else in the iPhone. By default, the screen brightness is set to the middle position, but halving that to one-quarter level is still plenty bright for seeing things on-screen.

It goes without saying that using the iPhone's iPod music function will consume more battery than, say, writing a text message, but you can minimise the drain on power by using the controls on the earphones to navigate through music and adjust volume rather than using the on-screen controls. Note: you'll need the headphones that came with the iPhone 3GS, but these can be bought as a separate accessory for those with earlier iPhones.

OPTUS 3G 5:27 PM
General
Network
Enable 3G
ON
Using 3G loads data faster, but may decrease battery life.
Data Roaming
OFF
Turn data roaming off when abroad to avoid substantial roaming charges when using email, MMS, web browsing, and other data services.
Internet Tethering
On
VPN
Not Configured
Wi-Fi
Off
OPTUS 3G 5:26 PM
Settings
Brightness
Auto-Brightness
ON
OPTUS 3G 5:26 PM
Mail
Fetch New Data
Push
OFF
New data will be pushed to your phone from the server.
Fetch
The schedule below is used when push is off or for applications which do not support push. For better battery life, fetch less frequently.
Every 15 Minutes
Every 30 Minutes
Hourly
Manually
iPhones are notorious for their lack of staying power, but there are a few things you can do about it.

OPEN SOURCE CHALLENGE

The good drop

With WINE improving with each release, why not do away with your dual-boot system to run Windows directly through Linux.

APC EXPERT

ASHTON MILLS

Ashton has been using Linux since Slackware came on floppies, and before that he was one of the three people in the world who used OS/2 (and loved it). Always ready to make the most of his PCs, he is constantly playing with Linux distributions and compiling the latest kernel. This is his idea of fun, and why we get him to write for *you*.

If you've been around Linux for any length of time, you've probably heard about WINE, aka *Wine Is Not an Emulator*. The self-recursive acronym borrows its inspiration from GNU (GNU's Not Unix). And while dual-booting and the advancement of easy-to-use virtualisation tools has made it relatively simple to run Windows with Linux, it's easy to forget that WINE is still a viable alternative — and one with two distinct advantages.

As it's not an emulator, and it's not virtualising a whole machine, Windows programs running through WINE on Linux are, for all intents and purposes, native. You run Windows programs, and they interact with your desktop, just the same as Linux ones. And, because all the code behind WINE was built from scratch, you don't even need Windows installed on your machine anywhere. Imagine that, running Windows programs without Windows *and* on your Linux desktop!

The problem with WINE, however, is that it's always been fiddly to use. Even the most hardcore Linux users are intimidated by its configuration files, and it often requires (even if free) third party packages to be installed to really bring it up to speed, like correct fonts and distributable libraries (like Microsoft's C++ runtimes, or DirectX) — though the fact it can tie into native Windows libraries this way is nothing short of amazing.

And that's where tools and, in some cases, forks of WINE come in: to make using WINE a snap.

INSTALLING WINE

If you haven't so far given WINE a spin, it's easy to install from Ubuntu's repositories. You can find it in the Add/Remove dialog or through Synaptic, but as is sometimes the case with Ubuntu this isn't always the latest version. And, with WINE, updates usually mean improved compatibility for programs.

At the time of writing Ubuntu provides 1.01, while the latest version available from Wine HQ (**www.winehq.org**) is 1.1.31. As we covered last issue, the easiest way to grab a tool like this is to add it to your sources — this way as it's updated it will show up in your Update Manager.

To add it to your sources simply click 'System > Administration > Software Sources > Third Party Software', and then if you're using Jaunty (Ubuntu 9.04) add a new repository:

```
deb http://wine.budgetdedicated.com/apt jaunty main
```

For other versions of ubuntu, see **www.winehq.org/download/deb**. Once you've updated your sources, install WINE.

USING WINE

By default you'll find WINE under Applications > WINE. You can tailor it with 'Configure WINE', but the default settings are usually sufficient. The most important setting is under Applications, where you can set the Windows version to

Who says gaming on Linux is limited. Here's the Spore demo running in a window on Ubuntu.
Steam
STEAM
» Play the latest games
» Find your friends
» Find the best servers
» Get automatic updates
» Chat with friends, even when in-game
» Receive Steam-only special offers
Create new account
Login to an existing account
VALVE
Steam runs just fine, as do many Source-based games.

Wine Doors - Initial Setup
Welcome to Wine Doors
It appears to be your first time using wine doors we first need to setup your wine drive and some other initial configuration in order to get you started using wine. Then we can begin installing your favourite windows applications.
Please enter your details
Your name
apcmag
Company name
I have a valid Microsoft Windows (tm) license
Installing Application Pack Courier New Font 1
Wine-Doors makes installing extra libraries and fonts simple.
Piriform CCleaner
CCleaner.com
Even Crap Cleaner runs! Its theme even matches Ubuntu.

report — this may have a bearing on programs that look for a particular version of Windows to run.

Launching a Windows program is as simple as running it. You can browse to your Windows partition and simply double-click on .exe files from Gnome's Nautilus file manager.

And it's here that WINE starts to show its limitations: some programs will run just fine, but others may refuse to run because a required DLL can't be found. This is often a function of the program not having been installed into WINE just as it was under Windows, so that its files can be placed into the correct 'path' and the Windows registry updated (yes WINE provides a registry too, of sorts). Hence many programs will have a greater chance of working if you install under Linux through WINE.

Even so, WINE sometimes lacks other files or features that may be part of a standard Windows install, and that's where programs like Wine-Doors (**www.wine-doors.org**) come in, providing a one-click interface to installing common libraries and fonts to complement your WINE install. Unfortunately, at the time of writing, the Wine-Doors repositories were unavailable, but hopefully they'll be back up soon.

CROSSOVER AND CEDEGA

If you want a do-it-all-for-me approach to WINE, there are two — albeit commercial — alternatives: CrossOver and Cedega.

Both are actually forks of WINE and build upon it by creating easy-to-use interfaces and application profiles that pre-configure WINE 'bottles' (aka. multiple separate virtual containers, as it were) for specific programs. Even though these are paid products, being based on WINE code, funds are contributed back to the WINE project and thus actually help fund WINE development.

CrossOver (**www.codeweavers.com**) comes in two varieties: one for productivity applications, and one for games. The former is optimised to run programs like Microsoft Office and Adobe Photoshop, while the gaming edition can set up WINE to run a host of games including Half-Life, EVE Online, and even World of Warcraft.

Cedega (**www.cedega.com**) is much like CrossOver's gaming edition, but perhaps with a little more focus. A wider range of gaming profiles are available, and its configuration options allow fine-grained control over how WINE operates, right down to specifying what shader level to support for accelerated 3D graphics.

Both will allow you to install any Windows program, profiles just help configure WINE for each particular application and, in some cases, extra functions or libraries that were needed for the program to run have been written and supplied in the package. This is exactly the type of code that ends up making it back into the WINE project for future versions.

Which begs the question, if more and more applications become supported over time, including games, why bother with CrossOver and Cedega? It comes down to ease of use — they both do a good job at making installing and running Windows programs a point-and-click affair, something which is not always guaranteed when you're fiddling with configuration files yourself.

Both come with demo versions, and Cedega even supplies an option to download the Spore demo and show off how well Linux can run not just games, but *Windows* games. I just have to put that into perspective again: play Windows games, without installing Windows. WINE really is a remarkable project.

So if you're used to your dual-boot, and you want to take a break from your VirtualBox images, don't forget WINE is still out there and still going strong — for over fifteen years in fact. The latest development versions even have preliminary support for the changes Windows 7 brings. As long as you don't expect every program to run — it's still in development, remember — you still might be surprised by what does work. You may even find yourself dual-booting to Windows less!

MORE ABOUT... PERFORMANCE

For the most part, as native Linux libraries, Windows programs running through WINE really do run as native Linux programs — faster than virtualisation can provide, and without the overhead of emulating an entire machine. However, as the Linux graphics pipeline is entirely different to Windows, translating DirectX calls can sometimes be fast, or slow. Every game is different, but you can only try. When running full-screen, in some cases you'd be hard pressed to tell if they were running on top of Windows or Linux.

IN THIS ISSUE

94 Make music from numbers
97 Create your own platform game
100 Create long exposure images

FRACTALS

Make music from numbers

Continuing our exploration of fractals, **Mike Bedford** applies mathematical equations to melody.

WHAT YOU'LL NEED

FRACTAL HARMONIES

This is used to create melodies from the Mandelbrot Set. You can download the latest version from *www.digitaldarkroom.com/fh.zip* and the documentation from www.bit.ly/KIKzH. You'll also find a copy on our web site at *www.apcmag.com/workshops.htm*.

GINGERBREAD

You can find this fractal music program on our web site at *www.apcmag.com/workshops.htm*. This software was originally shareware with limited features; it's now free but you'll need to enter dgbdbgbgfhbkababcc~hf at 'Help > Register' to enable the full range of features.

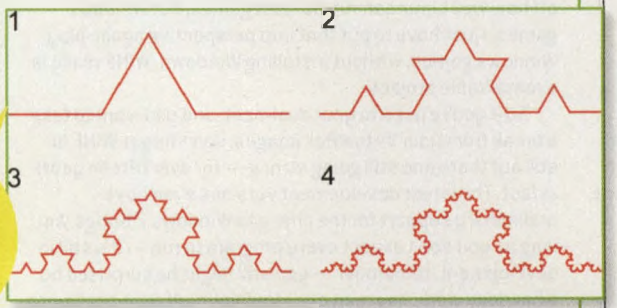
That the laws of mathematics can produce astonishing images is well known. Artistically minded mathematicians have produced some absolutely staggering pictures, with the infinitely explorable Mandelbrot Set one of the pinnacles of their achievements. What's less well-known is that the world of numbers also overlaps with the world of music. By turning sequences of mathematically generated numbers into notes, you can create unique tunes.

Fractals are among the best known and most visually appealing mathematical curiosities, so they're going to be the mainstay of our investigation of mathematical music. A fractal is a geometrical figure that appears similar at all levels of magnification. As we saw last issue, an easy-to-understand example is the Koch Curve. This is generated by taking the shape of a four-segment line and repeatedly, generation by generation, replacing each line segment with a smaller version of the original whole.

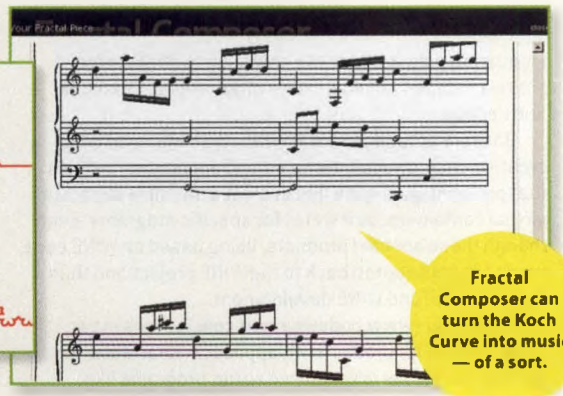
To get the proper Koch Curve you'd have to go on like this forever, but the diagram below shows the first four generations of the process to give you an idea of what this particular fractal looks like. The mechanisms used to generate such visually pleasing shapes can also be used to create some fascinating melodies.

THE SOUND OF MUSIC

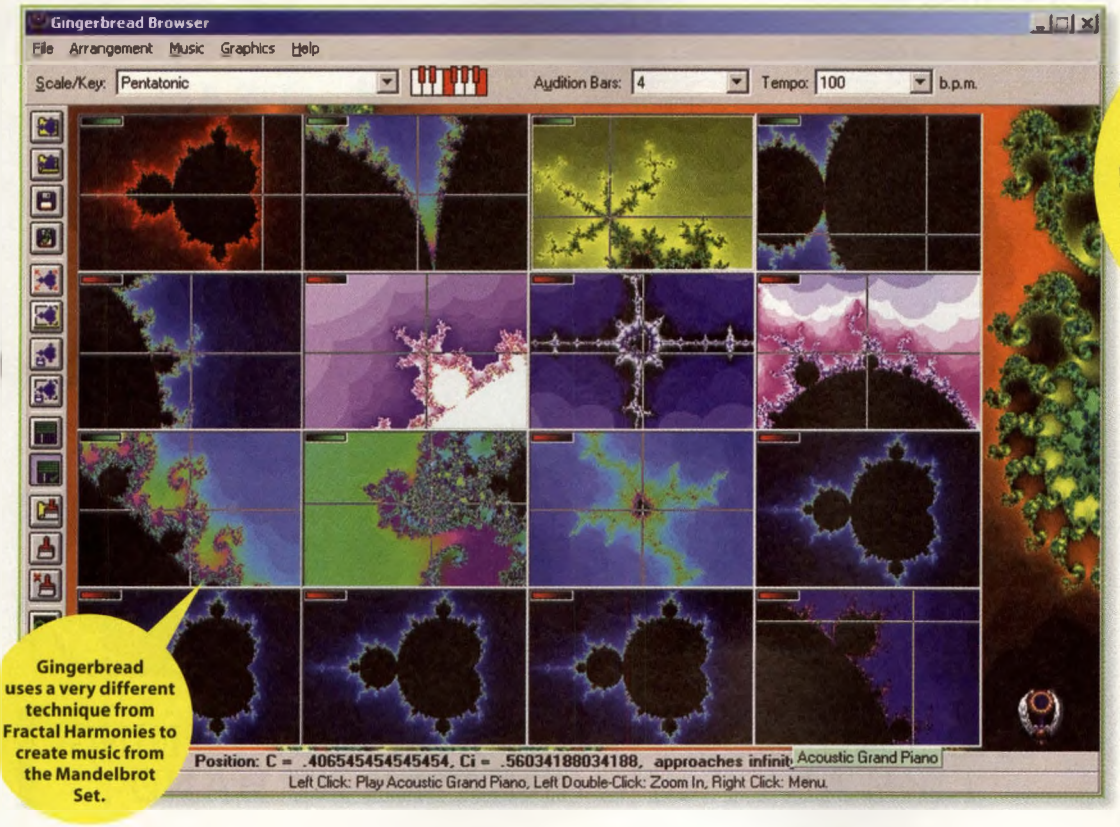
Things are a little different with music, though, since it has both pitch and rhythm. The fractal method of repeatedly replacing the original with scaled-down versions can be applied to both, but if you attempt this without making any further modifications you'll note that it really doesn't work too well. First of all, while certain musical intervals — that's the difference in pitch between two notes — sound good, others sound peculiar. As you start to divide down the intervals to produce a scaled version of the original musical motif, even if you start with intervals that sound right, you very soon end up with ones that most certainly don't. And that's just the start of your problems. Western music uses notes that differ by a semitone. However, as you continue driving down the intervals you'll soon get to intervals that are less than that. As the gaps get ever smaller, the whole



Fractals like the Koch Curve appear similar at all levels of magnification.



Fractal Composer can turn the Koch Curve into music — of a sort.


Gingerbread Browser
File Arrangement Music Graphics Help
Scale/Key: Pentatonic
Audition Bars: 4
Tempo: 100
b.p.m.
Position: C = .406545454545454, Ci = .56034188034188, approaches infinit
Acoustic Grand Piano
Left Click: Play Acoustic Grand Piano, Left Double-Click: Zoom In, Right Click: Menu.

Gingerbread uses a very different technique from Fractal Harmonies to create music from the Mandelbrot Set.

thing starts to sound like a gradually changing audio tone rather than music. Much the same thing happens with rhythm: you end up with music in which the notes are just too short to register, again contributing to something that could be best described as a cacophony.

Perhaps this isn't an encouraging start, but we can persevere by looking at an online application called Fractal Composer. The algorithm we'll try is similar to the one we've just considered, but it has some modifications in an attempt to overcome the drawbacks. You can learn more on the web site but, for now, let's just say that when a new generation of the base fractal is created, the pitches of the notes are added to the notes of the previous generation without scaling them down. Measures are also taken to prevent the notes from having ridiculously short durations.

To take your first steps in fractal composition, go to **http://fractalcomposer.com/compose** and enter D4,1/8 E4,1/8 C4,1/8 C3,1/8 G3,1/2 into the Germ box to define a five-note 'germ'. That's the first generation of the fractal. To see your germ in musical notation and listen to it, click on the musical note icon next to the Germ box. Be careful here: Fractal Composer is fussy about which browsers it will work with, so you might need to install a new browser — perhaps Mozilla Firefox — to get it to work. You'll also need the QuickTime plug-in installed.

Once you're in business, you should recognise our riff as the famous five-note theme from the movie *Close Encounters of the Third Kind*. Now click on 'Generate Piece' to see and hear your fractal creation in all its glory. You should recognise some self-similarity at various scales, but it's certainly a bit odd in places. Fractal Composer's creator admits: "It doesn't always sound good, but I find that it nearly always sounds interesting."

If you keep experimenting, you should be able to create something slightly more appealing.

MANDELBROT MELODIES

The Koch Curve — and music composed using similar principles — can be thought of as a fractal that's designed from the bottom up. The Mandelbrot Set (and similar fractals created using what mathematicians call an escape type algorithm) are quite different. These are produced by applying a simple set of rules. To the uninitiated, the fact that these rules can give rise to a fractal figure of such complexity and diversity is quite an eye opener.

Because the Mandelbrot Set is so visually appealing, numerous attempts have been made to use it as the basis of musical composition. Strictly speaking, a true representation of the Mandelbrot Set would be purely black and white, since any point is either a part of the set or it isn't. However, most images show the familiar shape surrounded by coloured bands that can be thought of as contours representing how close each point is to being in the Mandelbrot Set. Picking a line through the Mandelbrot Set and assigning a musical note to each of the colours along that line is perhaps the most obvious way of representing it audibly. This is the method used by the Fractal Harmonies application.

Start up Fractal Harmonies and an image of the Mandelbrot Set will appear on-screen. You can generate a tune from this opening image, but you'll probably prefer to zoom in on it to find a particularly interesting area. Zoom by dragging the crosshair cursor and repeat this as often as you want. Since this is a fractal, you'll find that the detail goes on forever. Or at least it would in a perfect world: you'll eventually run out of detail on your screen, but that's just a necessary limit of the software implementation. Always choose to zoom in on an area where the contours change rapidly — if you zoom in on the black area of the Mandelbrot you'll find nothing but more blackness.

When you've found somewhere you like the look of, click

Missed a tutorial?

Go to apcmag.com or www.magshop.com.au for back issues of APC

DO THIS... CELLULAR AUTOMATA

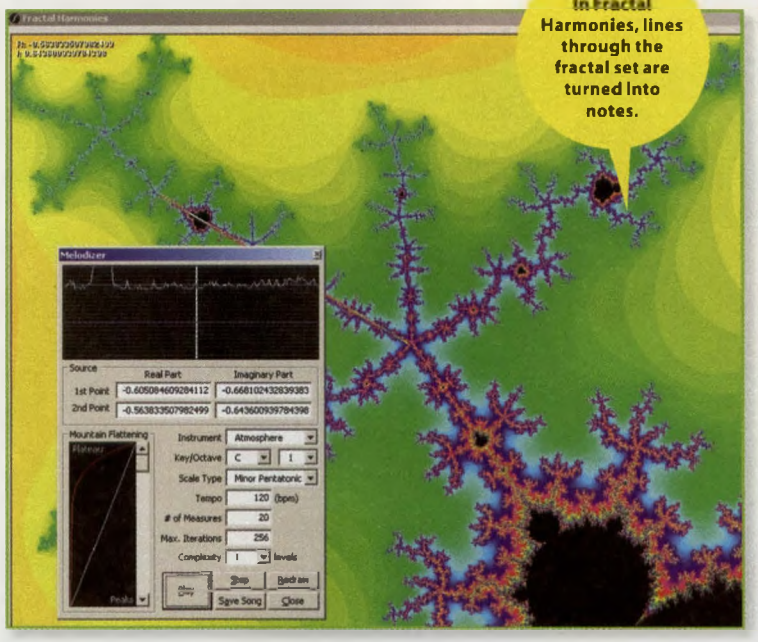
As far as mathematical music goes, fractals are just the tip of the iceberg. To show off a different type of mathematical music, we'll delve briefly into the world of cellular automata (CA).

Like fractals, CA can produce some amazingly complicated patterns from a simple set of rules. Here we're going to be composing music from a one-dimensional cellular automata.

Go to *http://tones.wolfram.com* and click on 'Start Now' to go to the music generation page. A portion of a randomly generated cellular automaton will appear at the top of the page, and its musical representation will start to play. Each time you click on one of the style buttons (such as classical, dance, hip-hop and so on) you'll get a new CA and hear a different composition. There are lots of other options, but for now just stick with those and continue until you find something you like. Click on the 'Download' button just below the picture of your CA and provide either your email address or mobile phone number. Depending on your choice, you'll receive your tune as a MIDI email attachment or as a ringtone. You might have to persevere — the email doesn't always turn up.

MORE ABOUT... USING OTHER NUMBERS

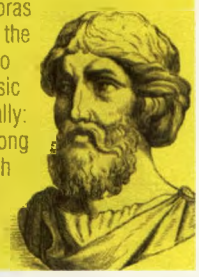
Does the fact that musicians like Phil Thompson have been able to create more convincing music from the Mandelbrot Set using Gingerbread than I managed show that we're really hearing the sound of the Mandelbrot Set, or are we hearing the result of a rather clever mapping of numbers onto notes? Perhaps the acid test would be to take truly random numbers and attempt to turn them into music. If such an endeavour were successful we'd probably have to discount fractal music as little more than the result of clever manipulation. The prime numbers — those that are divisible only by themselves and one — while not entirely random, have no discernible pattern, yet many mathematicians have tried to use them as the basis for musical composition. You can find an attempt at generating music from them at *www.geocities.com/Vienna/9349/primesb3.mid*. You'll probably find this far less convincing than the music of the Mandelbrot Set: reasonable proof that fractal compositions are the result of rather more than a contrived algorithm.



In Fractal Harmonies, lines through the fractal set are turned into notes.

IT'S ALL GREEK TO ME

Using the rules of maths to generate music is a relatively recent phenomenon, as the process needed computer technology to take away the donkey work of calculation. But the fact that music has a mathematical foundation has been known for much longer than that. Pythagoras was perhaps the first person to interpret music mathematically: that was as long ago as the 5th Century BC.



> THE MANDELBROT SET SOUNDS NOTHING LIKE ANYTHING CREATED BY HAND

on the 'Melodizer...' button and then drag the cross-hair cursor along the line you want to listen to. As with zooming, make sure you pick a line where the colours change rapidly, otherwise you'll end up with a rather boring composition. The Melodizer window will appear and a graphical representation of the pitches of notes along the line will be drawn. Finally, click on the 'Play' button to hear how your composition sounds. By default, the key is Minor Pentatonic. This gives the music an oriental flavour that seems to suit the music that's created this way. Feel free to try out the various options on the Melodizer window — you'll find that some of them make a vast difference to the end result.

Fractal Harmonics can also display and generate music from the closely related Julia Set. To draw a Julia Set just click on the 'Mandelbrot Set' button and you'll find it changes to 'Julia Set'. Now just click on any point in the Mandelbrot Set to draw the associated Julia Set (there is a Julia Set for any point in the Mandelbrot Set). Does the Julia Set have a different characteristic sound to the Mandelbrot Set? We'll leave you to decide what you think on that front.

A DIFFERENT APPROACH

We're now going to turn our attention to a quite different way of composing music from the Mandelbrot Set. In order to understand how this works, we need to know a bit more about how it's generated. To cut a long story short, the process involves testing each point on the complex plain to see whether or not it's in the Mandelbrot Set. That test requires a simple mathematical operation to be carried out over and over again. For some points, however many times you carry it out, the end result will never get particularly large — these are the points within the Set. For other points, the result heads off towards infinity very rapidly. So in testing each point we end up with a series of numbers, some of which are flitting around a series of fairly low values, others escalating rapidly. The Gingerbread application uses these number sequences as the basis for musical composition.

To see how this works, start Gingerbread. The opening screen shows 12 views of the Mandelbrot Set — initially they're all identical. Double left-click on any of the views to zoom in round that point and see it in more detail. When you've finished zooming, left-click anywhere to hear a rendition of the melody associated with that point. Do this in as many or as few views as you want — your final composition will be made by playing each of these melodies together.

To make a particular view a part of your composition, click on the red icon in the top-left corner. It'll change to green graduated to black, indicating that it's selected but muted. Click again and it will change to black graduated to green, indicating that it's un-muted. Also, for any views you want to include in the final composition, right-click and select 'Store Coordinate' in the drop-down menu. Now, click on the 'Play Composition' button to hear your creation. By default, all the views play as an acoustic grand piano (with the exception of 10, which is percussion). You can change any of these settings by going to the Bar Laboratory from the Arrangement menu.

In the main, compositions produced by Gingerbread are best described as 'strange'. That's probably not too surprising: the Mandelbrot Set, while having some sort of odd alien beauty, looks nothing like anything ever created by the hand of man — so why should the music created from it be any different? If you're inclined to dismiss its musicality entirely, though, go and have a listen to some of the tracks that Phil Thompson has created using Gingerbread at **http://omegaville.com**. You might just change your mind.

GAMING

Create your own platform game

Jon Thompson adds enemies and makes it possible to kill your player in the second part of our series.

WHAT YOU'LL NEED

GAMEMAKER
The free version of the program will do for this tutorial. Find it at *www.yoyogames.com/gamemaker.*

GIMP
The GNU open-source program is an invaluable aid when putting together graphics and tiles. Grab it from *www.gimp.org.*

Last issue we introduced Yoyogames' Gamemaker software and the concepts underlying it. We used it to lay out a room for a simple platform game and showed you how to create animated GIF files using GIMP, add objects that must be collected, scroll the action within a window and control the player's character. This issue, we show you how to add and control enemies, kill the player, add a scoreboard and introduce some sounds — and much more.

1 ADD SOME ENEMIES

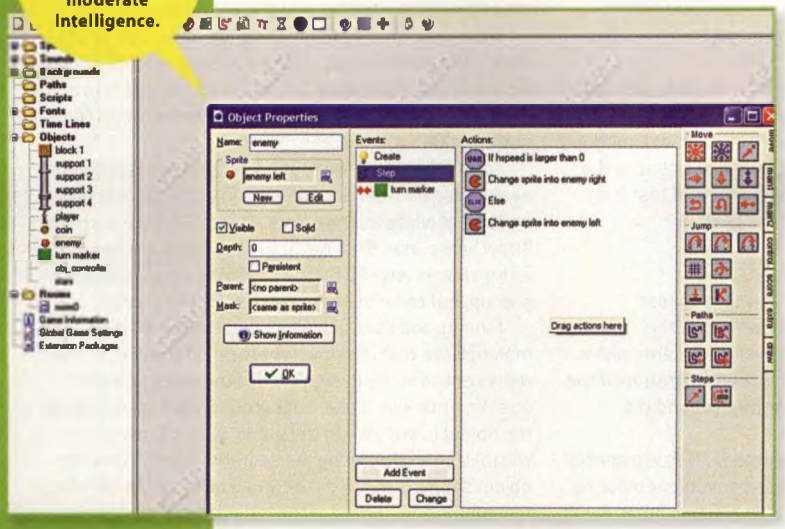
What platform game would be complete without lurking enemies to avoid at all costs? The first step to doing this is to add sprites that will represent them on-screen. We've designed a pair of small animated GIFs that will represent the enemies. To get started, create two new sprites in Gamemaker, call them 'enemy left' and 'enemy right', and load the appropriate animated GIFs. Make them transparent to remove the background colour, and enter 12 in the 'x origin' and 1 in the 'y origin' input boxes. This ensures that the sprites sit correctly on the platforms and interact with the player as you would expect. If you have a problem with the placement of objects or collisions when you lay out a room, try adjusting these values.

When an enemy gets to the end of a platform, we want it to reverse its direction. So if it's facing left we need it to face right, and vice versa. To simplify this surprisingly complex logic, use an invisible 'turn marker' object. Create a new sprite and load the green turn marker image. This 8 x 8 pixel image won't appear in the game, but collisions with instances of it tell the enemy when to turn. Create an object called 'turn marker', associate the turn marker sprite with it and ensure the 'Visible' box is left un-ticked.

Next, create a new object, call it 'Enemy' and tick the box marked 'solid'. Click 'Add Event' and click 'Create' in the subsequent pop-up menu. This allows us to define actions that will be undertaken when the object is created.

Click on the Move tab and drag the 'Move Fixed' icon onto the Actions pane. If you hover the mouse over an icon, a tool tip will tell you which is which. A window opens where you can specify the direction and speed for the object. Press the right-hand button and enter a speed of 3.

Click 'OK' and add a new event. Select the 'Step' event from the pop-up menu and choose a specific type of step. This action will be executed at every update step the game logic makes. Click on the Control tab and drag the hexagonal 'Test Variable' icon to the actions pane. This opens a pop-up box for the parameters of the test. For the variable, enter hspeed. Enter a value of 0 and select 'larger than' from the drop-down menu. Click 'OK' and then click the Main1 tab. Next, drag the 'Change Sprite' icon from the Sprite section into the Actions pane. A pop-up box will appear. Select 'enemy right' as the sprite and enter -1 as the sub-image and 1 as the speed. The sub-image is a special value that stops the animation repeating from the first frame each step.



Adding actions to your enemies gives them life and moderate intelligence.

CREATE DEPTH

If you want to add a background object depicting a scene that's supposed to look further away than the rest of the action, load it into GIMP and blur it slightly. Go to filters, select the Blur category and select 'Blur' again. By applying more blurring to images that should appear further back, you can fool the brain into believing there's real 3D depth.

IN PERSPECTIVE

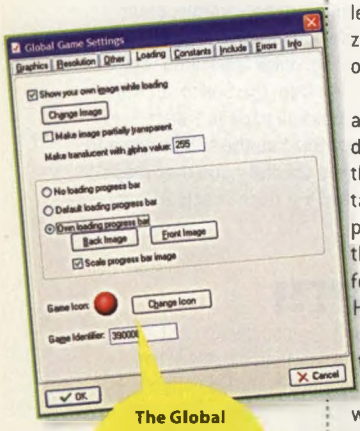
Open an object. The depth input box determines the drawing order. Those with a higher number are drawn first. By giving some objects a lower depth value than that of the player object, this gives you an easy way of making the player go behind those objects. This can increase the eye candy factor of the room significantly.

DO THIS... SET GLOBAL SETTINGS

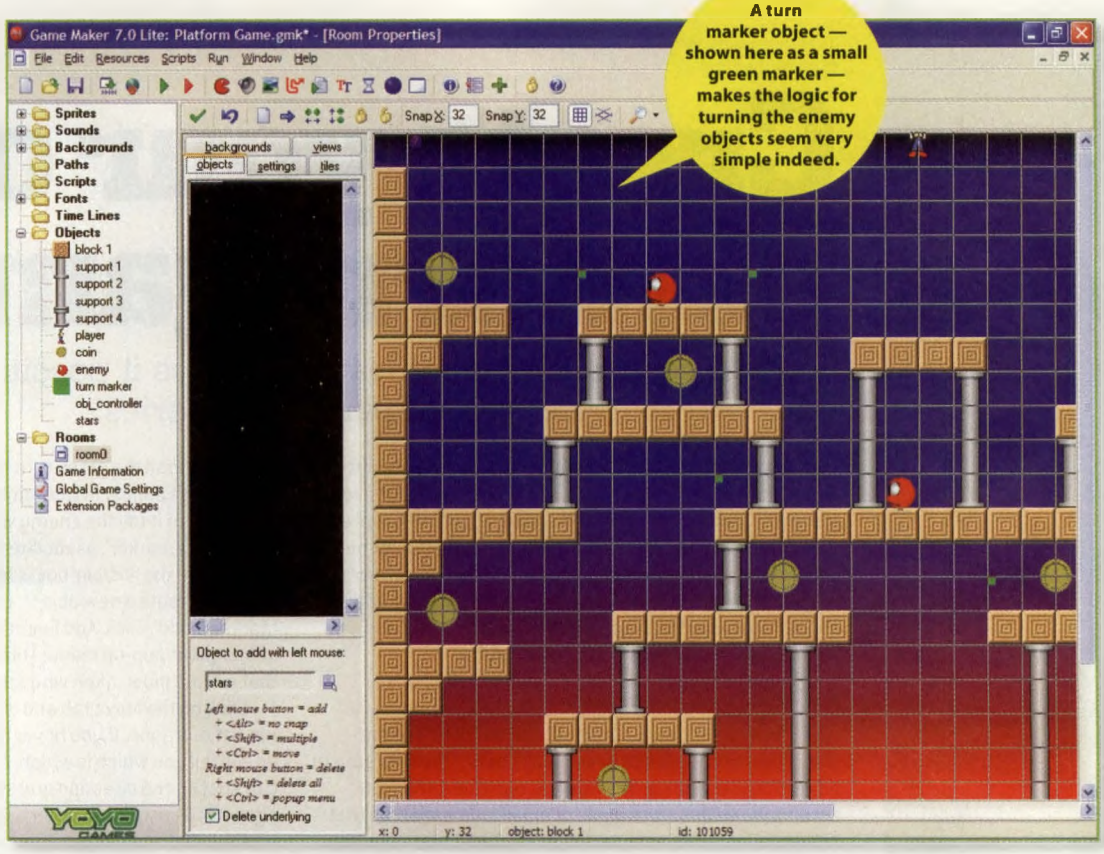
At the bottom of the main Gamemaker interface is a Global Game Settings section. Here, the Graphics tab allows you to define how the game window will look and act, including allowing the player to stretch it and pausing when it loses mouse focus.

The phenomenon of 'tearing' can occur when your game scrolls and the graphics are updated in a jerky way. To prevent this, click on the Resolution tab, select 'Set the resolution of the screen', make sure the colour depth, resolution and frequency are all set to 'No change' and then click on 'Use synchronisation to avoid tearing'.

The Loading tab allows you to specify a splash screen to display when the game starts up. You can also define your own progress bar here. Simply load an image to use as the background and foreground picture. You can also redefine the default game icon as it appears on the taskbar.



The Global Game Settings tabs let you set a wide range of options, including the loading screens.



A turn marker object — shown here as a small green marker — makes the logic for turning the enemy objects seem very simple indeed.

From the Control tab, add an 'Else' icon and another 'Change Sprite' icon to the action panel. This time, select the 'enemy left' sprite. This logic says that if the sprite is going left to right (in other words, if the hspeed is greater than zero), set the sprite used to show the object facing right; otherwise, make it face left.

Remember that turn marker object? Whenever an enemy collides with one, it'll change horizontal direction. To do this, add a collision event and select the turn marker for the associated object. From the Move tab, drag the 'Reverse Horizontal' icon into the actions pane. If you need the enemies to change direction when they hit a side wall, simply add another collision event for the relevant block object, with an action of 'Reverse Horizontal'.

Now, open the room we created in the first part of this tutorial and add some enemies. When you want them to change direction, add a turn marker object. These markers won't show up in the running game, but they'll control the enemies' movements. Now, save the game and test it by pressing F5.

2 MAKE A GRAPHICAL SCORE

Last issue, to show how to alter and test variables, we explained how to directly manipulate the score variable. However, with Gamemaker we can handle and create a graphical representation of the score, the number of lives the player has left and the player's health.

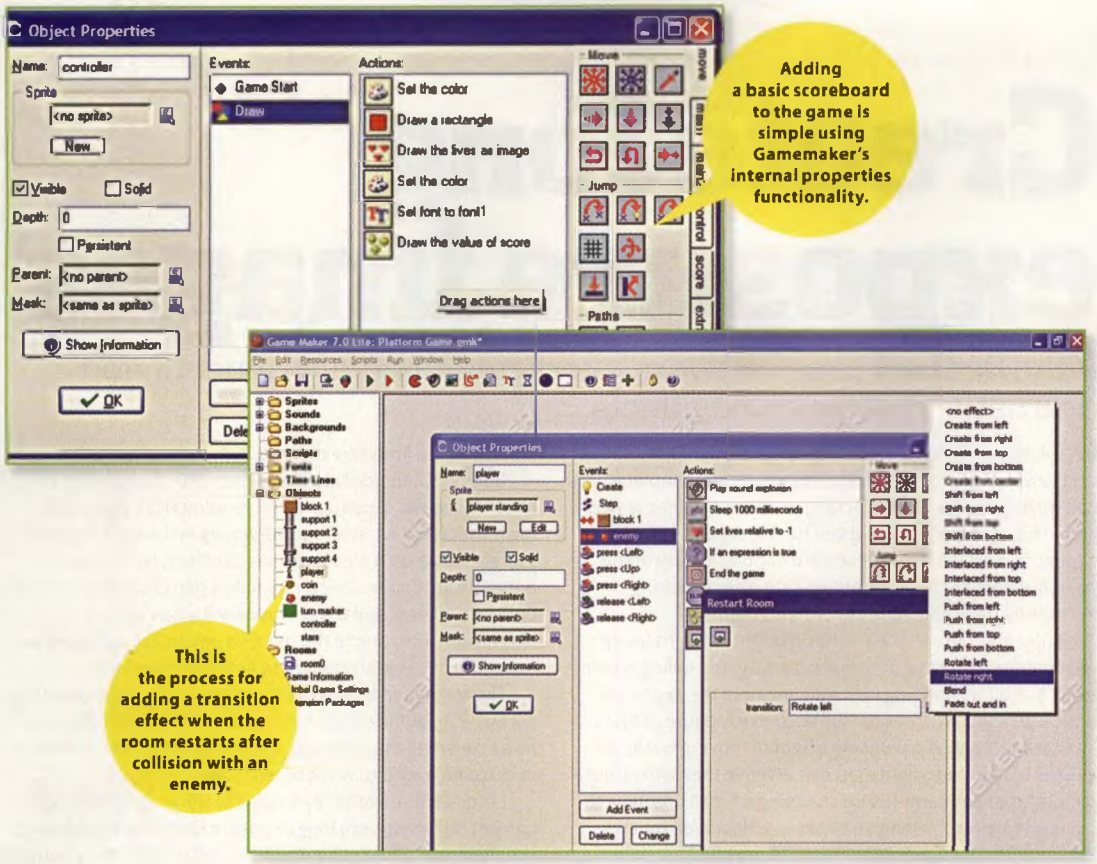
First create an object called 'Controller'. This is a special object that has no sprite: it's merely a convenient place to deposit some useful functionality. Add a 'Game Start' event to this object (it's under 'Other' on the Add Event submenu). Press 'OK' and add a 'Set Lives' event. Set the number of lives to 3 and press 'OK' again.

To display the score and lives, we need to add a 'Draw' event to the controller object. From the Draw tab, add a 'Set Colour' event and set the colour to black. Now add a 'Draw Rectangle' event. For the x1 and y1 values, enter view_xview and view_yview. These values are system variables that give the top left position of the scrolling view of the room that follows the player around. For the x2 and y2 values, enter view_xview+120 and view_yview+80. These values ensure that the rectangle is a big enough area to accommodate the lives and score data.

Next, from the Score tab, drag the 'Draw Life Images' icon to the Actions pane. In the pop-up, enter the values view_xview+10 and view_yview+30 for the position of the lives. Select the 'player standing' sprite for the image value and click 'OK'.

To add the score, we first have to set the text colour again. Drag another Set Colour icon to the actions pane and select white as the colour. Press 'OK', then drag the 'Draw Score' icon from the Score tab to the Actions list. Enter view_xview+10 for the position in the Lives action pop-up, but enter view_xview+120 for the y value.

Finally, add the Controller object to the room, making sure that it's somewhere out of the way. It'll be represented in the design view of the room as a pink question mark on a blue background. As it has no sprite, the object is invisible in the game, but its Draw action will take care of drawing the scoreboard each time the object's logic is run. Run the game and you should see three lives and a score in the top-right of the window.


Adding a basic scoreboard to the game is simple using Gamemaker's internal properties functionality.
This is the process for adding a transition effect when the room restarts after collision with an enemy.

3 MAKE THE PLAYER MORTAL

Next, we need to add some logic to the player's object so that when he collides with an enemy his lives go down, and if they reach zero it's game over. To do so, add another collision event to the player's object and select the enemy for the collision object. Add the 'Sleep' action from the Main2 tab to this action and leave the interval at 1,000ms. Add the 'Set Lives' action from the Score tab, and in the associated pop-up make the new lives -1 and tick the box marked 'Relative'. This ensures that whatever the current number of lives happens to be, one will be subtracted from the value.

We also need to test to see if there are any lives left. If there aren't, we'll exit the game, but if there are, we'll reset the score and restart the room. To add this logic, drag the 'Test Expression' icon into the action pane and enter the expression lives=0 into the subsequent pop-up. Now add the 'End Game' action from the Main2 tab. Add an 'Else' action from the Control tab and 'Set Score' from the Score tab. Enter a value of 0 in its pop-up. Finally, add a 'Restart Room' action from the Main1 tab. Select a graphical transition effect to go from the current room state to the restarted state, then re-run the game and collide with an enemy. The score should return to zero, you should lose a life and the game should use your transition type to reset itself.

4 ADD SOUNDS AND MUSIC

So far, our game has been silent. We can change that easily, but finding or creating exactly the right sounds and music can take time. Luckily, there are plenty of sites where you can download copyright-free sounds.

To add sounds to events in the game, we need to create a sound object and import an associated sound file. Click on the speaker-like object on the taskbar and a dialog box will open. Give the sound the name 'explosion' and click 'Load Sound'. This opens a file selector. Navigate to the file you want to use (Gamemaker understands WAV and MP3 sound formats, and can play MIDI data files using the synthesiser in your soundcard) and press 'OK'. You can adjust the volume and panning of the sound before finishing. If you have the full version of Gamemaker, you can use the Effects section of this box.

To add an explosion sound to the collision between the player and an enemy, open the player object, click on the enemy collision event and select the Main1 tab. Next, drag the 'Play Sound' icon to the actions pane. A pop-up box will open. Select the explosion sound from the drop-down menu, and decide whether it should loop. The action will appear at the end of the list but we need it at the beginning, before the 1,000ms delay. To move it, click and drag the action to the top of the list. Also add the 'points' sound file and associate it with the coin object's player collision.

If you want to add a music track that plays all of the way through the game, add another sound object to the game and add a 'Play Sound' action to the controller object's 'Game Start' event. In the pop-up box that appears when you add the sound event, set 'loop' to 'true'. The music will now play throughout.

DO THIS... PARALLAX SCROLLING

Increase the eye candy factor of your games by adding parallax scrolling backgrounds. Open Paint, create an image of 1,024 x 768 pixels, fill it with black and add small white pixels to represent stars. Add a crescent moon. Next, create a new sprite named 'Stars background', make it transparent and import the image. Create an object, call it 'Stars' and set its depth to 1,000. Next, add a 'Step' action to the object. We only want the stars to scroll when the view window scrolls. From the Control tab, add a 'Test Expression' icon and enter (player.x>320) and (player.x<680) for the expression. Add a 'Set Variable' action and enter x for the variable and (player.x/2)-256 for the value. This will make the stars scroll horizontally at half the player's speed.

Add a second Test Expression. Enter a value of (player.y>240) and (player.y<480), then add a second Set Variable action, using y as the variable and (player.y/2)-128 as the value. Finally, add the Stars object at the top-left of the room and run the game.

PHOTOGRAPHY

Create long exposure images

Mike Bedford uses software averaging to create unusual and dramatic photographic effects.

WHAT YOU'LL NEED

COMBINEZM
This is the software that we'll be using to simulate long exposures. You can download it from *http://tinyurl.com/5kfxfj*.

NEUTRAL DENSITY FILTERS
Although we'll be mostly simulating long exposures using software, we'll explain how to take genuine long exposures in daylight. To do this you need one or more neutral density filters.

Back in the early days of photography, plates were so slow that exposures of several minutes were commonplace. This had major drawbacks, especially for human subjects who had to sit or stand perfectly still for the duration of the exposure. Stiff Victorian poses are happily a thing of the past, but some of the interesting side effects of long exposures have also faded away with them.

If you photograph a waterfall in bright sunlight using your camera's normal automatic setting, the falling water looks like blobs hanging in the air because the exposure time is so short. With a quarter-second exposure, it blurs into streaks, giving a pleasing effect of moving water. As long as it's not too bright, you can achieve this with all but point-and-shoot cameras by choosing a small aperture to compensate for the longish exposure. However, for still longer exposures special techniques are needed. Here we look at those techniques and at some of the special effects you can achieve.

THE PROBLEM

Some effects that can be achieved using long exposures are well-known. These are mainly night time effects and include the streaks of headlights as cars drive along a road or the paths of stars as they move through the night sky. As long as you use a tripod to keep your camera steady, these types of photograph can be taken without difficulty with any camera that allows you to take a picture with a longish exposure.

Now let's consider another effect. We've seen that a quarter-second exposure can give a waterfall a sense of movement, but what about the waves in the sea? Again there's scope for a pleasing blurred effect, but things are not quite so simple. There's usually a gap of several seconds between waves, and those waves will often vary in magnitude from one to the next, so you might well need an exposure of several minutes to get the desired effect.

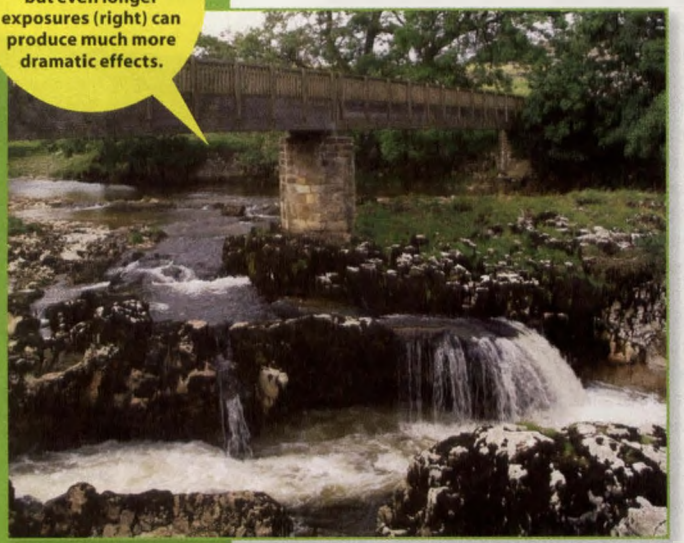
The result can be absolutely stunning in an otherworldly sort of way, but there's a major problem. In bright daylight, however small the aperture, such long exposures will result in extreme over-exposure of the image.

Later we'll see other examples of the unique effect you can get by taking very long exposure shots during the day, but right now we've got a problem. Fortunately there's not one solution, but two.

THE SOLUTIONS

The first solution predates digital techniques, but it works just as well with a digital camera. Reducing the camera's aperture is one way of reducing the amount of light entering the camera, thereby allowing you to increase the exposure time, but you can only go so far with this method. Another way is to put something called a neutral density filter over the lens. These filters are grey, and simply reduce the amount of light reaching the lens. They come in three (or

A quarter-second exposure (left) makes a waterfall look good, but even longer exposures (right) can produce much more dramatic effects.



The inset shot shows how this scene looked normally, but by combining several shots we've removed all the people.

occasionally four) strengths: ND2, ND4, ND8 and (with a few manufacturers) ND16. The number refers to the increase in exposure time that will result from using the filter. For example, an ND4 filter reduces the light to a quarter and therefore requires an exposure time four times longer to compensate. However, even an ND16 will be insufficient for many effects. The solution is to use more than one filter (the factors multiply together, so two ND8s are equivalent to ND64). Depending on what you're after, you may need three of them.

Since using neutral density filters to reduce the light by 128-fold, say, allows you to take very long-exposure photographs, you ought to be able to do the same by taking 128 photographs as normal and then averaging them in software. This is the second method, and the technique we'll be concentrating on here. However, before we start, a few words on the pros and cons of the two techniques are appropriate.

The main advantage of using filters is that you can preview the result immediately on your camera's LCD panel. With the software approach, unless you're carrying a notebook with you, you'll only see the end result when you're back home — so if you find that you didn't get it quite right then you could be in for a long trip to try again. In most other respects, though, the software solution is the clear winner.

The first advantage of using software is cost. The utility we're using here is free, but neutral density filters cost anywhere from around $15 to $200, depending on the size and quality. Since you may need two or three of them, this could become quite expensive. The second advantage is that the software method places no real constraints on the maximum exposure time. Whereas a DSLR may offer maximum exposure times measured in minutes, with compact cameras you'd probably be talking in terms of seconds, which isn't enough for most of the effects we're trying to achieve. And finally, compared to using neutral density filters, an advantage of merging lots of photographs using software is that you can decide only to take shots when something interesting is happening. In the case of blurring the waves of the sea, you can choose times when waves are breaking somewhere in the shot.

THE EFFECTS

So far we've hinted at the opportunities on offer by taking long-exposure photographs in daylight, but only spelled out one of them. If you decide to try your hand at this form of photography you'll discover lots of interesting effects as you unleash your creative talents. To set the ball rolling, though, here are another couple of possibilities.

Some scenes look right with people in them — a photograph of a seaside resort would look most peculiar if it was deserted, for example. With other scenes it's very different — a picture of a stone circle on a windswept moor looks totally incongruous with a random selection of tourists touting video cameras.

Architectural shots often look better with no people in them too. Yet the frustrating experience of trying to take an empty shot is well-known. You wait for ages for one person to move and the second that person goes out of shot, someone else appears in a different part of the scene. The solution is to use a long exposure. If your exposure is, say, five minutes, no one person will stand still long enough to register. But the static parts of the scene — the portions

DO THIS... USE A TRIPOD

To take lots of photographs of the same scene, all perfectly aligned with each other, you need to make sure the camera doesn't move between shots. The easiest way to do this is to use a tripod, and a reasonably sturdy one at that. If you don't already have a tripod, they cost less than you're probably expecting. Excluding tiny tabletop models, tripods start at about $30 — take a look in a photographic store.

If you don't want to shell out for a tripod, you might be able to improvise. A solid structure like a wall, for example, can make a suitable support for a camera. However, since the camera won't be screwed down, it'll probably move by a small amount each time you press the shutter release — so this will only work if you've got a remote control. A small beanbag is useful if you're using a makeshift support like this because it provides extra stability and gives you more control over angling the camera. Occasionally you see special beanbags that are intended for photographic use. These let you suck the air out once the camera's in place, rendering them rigid.

MORE ABOUT... COMBINEZM

Since you'll be using CombineZM to simulate long exposure photographs, why not investigate some of the other creative effects that can be achieved by merging your photographs? CombineZM was written with a rather different application in mind — improving the depth of field of macro photographs where it's difficult to get everything in focus. By merging several photographs, each with just a portion in focus, a combined photograph can be produced in which everything is sharp. To learn more about this use of CombineZM, take a look at the CombineZM User Group forum at *http://tinyurl.com/yf42ut7*.

TIP... LOOK FOR DETAIL

Here we're using the fact that moving objects blur or even disappear in long-exposure photography to good effect. However, when choosing your scene or even your viewpoint, you really need to look for the detail to make sure that other moving objects don't produce undesirable results. For example, if you're using a long exposure to remove people from the shot, you'll want everything else to look normal. But if there are trees in view and it's windy, those trees will end up blurred. Other problem areas include clouds and flags.

There were just too many people here to average out, but the 'sea of people' effect is quite interesting.

SUITABLE SUBJECTS

When thinking of subjects where this technique will work well, pick scenes where most of the view is static but elements are moving. There's no guarantee that the end result will be attractive (although it'll certainly be interesting), so just try things out until you find what works and what doesn't. This is one area where you can really use your imagination when going in search of that perfect picture.

Here dozens of photographs have been combined to simulate a very long exposure and produce a dramatic effect.

you want in your shot — build up over time and will appear normally. Using this technique it's possible to photograph busy town centres with apparently nobody in them.

This doesn't always work, though, and a recent attempt to do this trick resulted in another interesting effect. The scene in question was the cobbled main street you can see in the photo above — a busy tourist spot on any occasion but absolutely heaving on this particularly sunny Sunday afternoon. The volume of pedestrians was such that some parts of the scene were never clear of people. So although no one person registered in the picture, those crowded parts of the scene showed a general blur. 'A sea of humanity' was how one onlooker described it when I told him what I was doing. For this sort of effect, use only a handful of shots so that people are just about recognisable as human beings rather than just a blur. You can also fine-tune the effect by making some photographs contribute more than others. You could do this by making extra copies of the ones you want to feature more prominently and including the copies in the photographs to be averaged. Alternatively, you could generate an averaged photograph normally and then merge the end result with any images you want to make more prominent.

THE PROCESS

Needless to say, taking lots of photographs of the same scene requires the camera to be placed on a tripod. Unless you have a remote control, use a reasonably sturdy tripod so that it doesn't move each time you press the shutter release. Also, be careful to make sure it's on firm ground. Exactly how many photographs you need depends on the scene, but you might as well start with plenty, perhaps as many as 100.

Once you've got your shots in the bag it's time to combine them, so start up CombineZM. Select 'New' from the File menu and the Open dialogue box will appear. Now select the photos you want to combine (using the Ctrl key to select multiple files) before clicking on 'Open'.

CombineZM will do some preliminary processing on those images — the status is shown in the Progress window. When you see the 'Set Undo Point for Quick Undo' message, you're ready to continue.

Select 'Replace Groups > Average' from the Stack menu and then click 'OK' on the Combine Frames dialog box that will appear. When CombineZM finishes (and this could take some time), the merged photograph will be shown on screen. Because of the way the algorithm works, you'll probably find that the merged photograph has been increased in size by 'reflecting' the outer edges. To get back to the original size, press A. The dotted line surrounding the image will jump to the correct position and you can now save the result by selecting 'Save Rectangle as' from the File menu. If you find that even the static parts of your merged photograph aren't sharp, the tripod probably moved a bit between some of the shots. All isn't lost, though. Repeat the process, but this time, before you carry out the averaging, select 'Size and Alignment' and then 'Automatic (Singles pass)' from the Stack menu to bring them all into registration.

Combing photographs is a processor-intensive task, and CombineZM may take some time. The length of time increases with the number of photographs, and you will hit a point at which it rises very significantly as you come up against the memory limit. If this happens, combine photographs in groups (say of 10) and then combine the end result for each of the groups. APC

masterclass
STEP-BY-STEP TRAINING

IN THIS SERIES

Ash Nallawalla continues his Masterclass, focusing on online marketing. This will cover online advertising, web site monetisation, network marketing, blogging for profit, affiliate marketing. . . and more!

APC EXPERT

ASH NALLAWALLA

Ash Nallawalla manages natural and paid search traffic for some of Australia's largest web sites. He is an internationally acknowledged expert in search marketing and he runs an online SEO training web site. Ash can be contacted at **ash@melbpc.org.au** or via his blog at **www.netmagellan.com**.

WHAT'S NEXT?

PART 2
JANUARY '10
NETWORK MARKETING

PART 3 ONLINE MARKETING

Affiliate marketing

Affiliate marketing is just one way to make money online. You will get what you put into it, and there are no shortcuts.

Affiliate marketing ultimately means getting commissions for sales made through your hard work, hence 'marketing'. In practice, it refers to commissions from online sales, but it could also come from offline marketing activities. Some people make a fortune from affiliate marketing and work for themselves, but the vast majority just dabble in it and either make some play money or they fail and give up.

If you sell something (you are known as a merchant) and you need help to sell a lot more, you need an 'affiliation' with marketers. Let's see if we can connect you with them. Since there are more affiliate marketers than merchants, we'll be looking at the subject mainly from their viewpoint.

PICK THE RIGHT MODEL

OK, so you know that you need a web site, but what do you put on it? Five years ago I was making over $1,000 each day for a short period, by directing my visitors to various merchants I was affiliated with. To display their products on my sites, I used scripts that relied on large product catalogues (datafeeds). There are two types of scripts:

- **Downloadable data files.** These are usually comma separated variable (CSV) files consisting of fields such as product name, description, product URL, image URL, price and some others. You have to make thousands of pages from a template on your PC and then upload them to the server. This is a very slow and inefficient process. There is a variant where you upload the template and the datafeed file to your server and pages are generated automatically as a visitor or spider follows a link.
- **Store builder.** These scripts are installed on your server and they generate a page automatically by requesting live data from the merchant's server. Such scripts use a 'web service' and therefore you always display the most up-to-date prices and products.

In addition to scripts, you can place elements of affiliate links on regular web pages. These could be buttons, banners, text links, Google AdSense and its imitators.

It is really important to note that I no longer make $1,000 per day. I don't even make that in a month most of the time. I know why that is so, but I don't have the time to fix it. If you are just beginning, please avoid my mistakes.

My big mistake was laziness. I relied on datafeed scripts to build dozens of affiliate sites featuring almost every product under the sun. Examples:

- eBay listings sites
- Amazon sites
- Fitness product sites
- Health product sites

Some affiliate programs allow multiple tiers of membership. This means that any new affiliate that I help to recruit makes me a second tier affiliate. For each sale they make, I get a very tiny, but welcome, commission. They continue to make their normal commission.

THIN IS OUT

Sometime in 2004 Google changed its algorithm to demote duplicate content. Do you remember the days when a search for a product brought forth dozens of results with the same information as Amazon or eBay, except that they were privately owned sites. If you put up hundreds of eBay sites, each showing currently available auctions, then it was possible for more than one of your pages to rank high and be found by a buyer. If they were a successful bidder, you got a few cents, but if they were new to eBay and registered for the first time, you made almost $20.

Google also introduced human-quality raters to rate samples of sites against written guidelines and a new term was introduced to the SEO world. 'Thin affiliate' sites were

LOWEST PRICES
FAST DELIVERY
Inexpensive & Easy to Assemble
Rubbermaid Sheds on Sale
Home > Air Freshener & Odor > Air Fresheners > Aerosol Fresheners > Product Detail
Ads by Google
Air Freshener Refills
Glade Spray
Glade Refill
Glade Circulair
Click picture for details.
Search
Johnson Diversey Glade Air Freshener
Description: Glade Air Freshener Eliminates strong, persistant odors with a clean fragrance. Use in commercial, industrial or institutional buildings. Contains no CFCs. VOC Compliant (Volatile Organic Compounds). 14-oz. aerosol can. Single Can Country Garden (Wt: 1.167 lbs)
Single Can, Country Garden,
Betty Mills Price: $5.00 EA
Click here to order directly from BettyMills
Click here for a $10 coupon off your first order!
Orders placed Mon-Fri before 12 noon PST normally ship same day and should arrive to you within 2-3 business days or less.
Total shipping cost never exceeds $50.00. Orders over $750.00 are shipped free of freight charges.
car air fresheners
California scents wholesale and distribution
Vehicle Air Fresheners
Tisco - Top National Importer & Distributor of Car Air Fresheners
Air Fresheners
Purchase Bathrom Air Fresheners Metered Aerosol Or Fan Forced
Ads by Google
A datafeed-based 'thin affiliate' page.

MORE ABOUT... ARBITRAGE

Some sites use arbitrage, namely, buying cheap AdWords clicks to bring traffic to pages that will attract more expensive AdSense clicks. Google doesn't like sites that use arbitrage. For some competitive niches, such as travel, most beginners have no chance of getting their pages to rank against the super-optimised travel sites that occupy the top rankings. Therefore, they need to invest in paid advertising, such as Google AdWords or Yahoo! Search Marketing. That is an art in itself, and the challenge is to make more money than the cost of your ads.

exactly what I had been building — they were thin because I didn't add unique content. Google does not like thin affiliate sites — poof — my sites disappeared and so did my $1,000 days.

Back then, Google AdWords would get clicks at quality sites such as Google or AOL Search and also on trashy affiliate pages (such as 'AdSense') and the advertiser would pay the same cost per click. To appease unhappy advertisers who were worried about click fraud and a lack of buyers, Google introduced differential pricing for 'Content Network' which included affiliate sites. Therefore, an advertiser who bid $10 per click on the quality Google sites could bid 10 cents for the same ad on the Content Network. Suddenly, lazy affiliates such as myself were making 60% of 10 cents and not $6 per click. When the Google duplicate filter came along, my pages simply disappeared from the home page, being full copies of Amazon, eBay or some merchant's web site, so I was making 60% of nothing.

For an example of Amazon and eBay datafeed-based affiliate scripts at work, see my neglected site **zuneusergroup.com**. See the two links in the top menu.

CONTENT IS KING

The solution for an SEO-reliant web site is simple but it requires hard work, namely the creation of unique content. So, if you have a web site consisting of original articles about some travel destination, you can put travel-related affiliate ads on the top, side or bottom (or the body of the article) and expect it to rank as well as your SEO skills allow. At least your pages won't be filtered out.

Imagine starting a new site about Mesothelioma — reputed to be a very expensive AdSense click. Unless you are a cancer researcher and are writing about your personal findings, you would be severely challenged to regurgitate content that is already available online. It would be difficult to get other sites to link to yours. Outranking the top 10 (or the top 100) search results would be near impossible for that one-word term. You would be better off finding a long-tail variant such as 'pleural plaques' (5,400 global searches per month) and focusing your site on this term.

Bear in mind that AdSense isn't the only game in town. You could sell advertising to a law firm if your page ranks higher than theirs and possibly earn more.

FINDING A NICHE

Although you could set up a site that lists thousands of products, don't try that as your first project. You might know that Las Vegas is a very popular travel destination, but don't build a site devoted to that city as your first project. Find a niche, preferably a topic near to your heart and perform some searches on Google using some likely keyphrases. If you see lots of sponsored ads on the side, then you know there is competition among advertisers.

If you are a student of deep space galaxies, you might not find any ads directly relating to that subject but you might notice that telescopes are featured heavily in advertising. You could write about telescopes — their types, sizes, where to buy them, how to use them, and so on. Write a well-illustrated review of your own telescopes. You could set up a discussion forum, and let other people write about telescopes. You can then concentrate on finding the highest-paying ads and the best part of the page to place them.

AFFILIATE TOOLS

The best tools are free:

- Google Search: **www.google.com.au**
- Google AdWords Keyword Tool: **https://adwords.google.com/select/KeywordToolExternal**

When you perform a Google search for 'telescope', you will notice a count such as 'Results 1-100 of 42,900,000'. There are over 100 unique ads. That is a very loose keyword as it includes the Hubble telescope and other types that are not available in affiliate programs. When you try a

Choose columns to display: ?
Show/hide columns

Keywords	Advertiser Competition ?	▼ Local Search Volume: September ?	Global Monthly Search Volume ?
Keywords related to term(s) entered - sort by relevance ?			
celestron telescope		3,600	49,500
celestron telescopes		1,000	18,100
celestron nexstar telescope		880	18,100
celestron nexstar 102 slt telescope		22	720
celestron 127mm telescope		Not enough data	110
celestron 50mm refracting telescope		Not enough data	22
celestron 76mm reflecting telescope		Not enough data	22
celestron astromaster 130eq telescope		Not enough data	390

Google AdWords Keyword Tool in action.

specific brand, such as 'Celestron telescope', the count of results drops to 1,370,000 and there are only 10 ads.

GOOGLE ADWORDS KEYWORD TOOL IN ACTION

If you head over to the Google AdWords Keyword Tool and enter the phrase 'Celestron telescope' you'll see counts for various related phrases. We will soon see why the Global figures are used for this example.

TARGETED TRAFFIC

If you have been following the earlier articles on SEO, you will know that the holy grail of all web sites is traffic, namely, humans. For affiliate web sites, this is further refined to mean buyers.

We picked a popular American brand of telescope as our niche, and so it is likely that our pages will come up in searches performed by Americans. If we placed contextual ads such as Google AdSense, then Americans will see more regionally targeted ads than, say, a viewer in India. If we carried only Australian ads, then they would be wasted on American visitors. If you know the make-up of your visitors, you can find an appropriate product to push to them.

The Google AdWords Keyword Tool tells us that there are more global searches for the Astromaster 130eq than the 50mm refracting telescope. Or that there are more searches for the Nexstar 102 SLT than the 130eq. After doing some research on these models, we might decide to write about the most expensive models, because the commission would be high. At the same time, we won't pick a model so expensive that few people could afford it and would trust an affiliate site to place an order. I can't emphasise enough that unless you solve the traffic problem, the best affiliate model will not make any money.

AFFILIATE MANAGERS

Merchants often don't have the skills to manage affiliates, so they use affiliate management companies such as Commission Junction (CJ) or LinkShare to run their affiliate program. These companies are also known as Affiliate Networks. Affiliates sign up with these companies if their niche is serviced by the affiliate manager.

Sometimes, as in the case with Celestron, you might find that the merchant has no affiliate program in place, but their reseller might have one. Occasionally, one brand might be available from more than one affiliate manager.

In that case you should look at the EPC (earnings per 100 clicks) figure. CJ shows both 3-month and 7-day EPC. The figures will vary depending on the creative (the ad) or the product. Before you pick the product with the highest EPC, find out whether it is an expensive product with a high commission or it is a cheap, high-volume sales product. This will help you decide whether to target the big spenders or the masses. If you can make $500 commission on a $5,000 telescope, then you don't mind spending $100 on AdWords on average to make a single sale.

T&Cs

Not only must you read and understand the merchant's terms and conditions, but you also need them to accept you as an affiliate. Some merchants accept all applicants, but others manually inspect your application and web site and they might reject your application.

An example of rejection is when your web site audience is mainly Australian and the merchant only ships to American postal addresses. Some affiliates are terminated if they use spam email to get sales or if they use underhand tactics such as stealing cookies of other affiliates and replacing them with their own.

Affiliate managers will give you the correct code or links to place on your web site. Your job is to implement the links correctly and to adhere to the rules of each merchant. For example, some allow you to use their brand names in AdWords campaigns, while others forbid it.

We have just skimmed the surface of affiliate marketing, but we'll dive deeper into individual topics in the coming months.

MORE ABOUT... GETTING PAID

Most affiliate managers pay to your PayPal or bank account when the commissions exceed some trigger figure. This is usually US$100. You should open a PayPal account for this purpose. US merchants require us to fill out a tax exemption form so that tax is not deducted. I always declare my meagre affiliate earnings to the ATO.

IN THIS SPECIAL

When he read a recent tutorial on home network security in APC, security consultant Phil Kernick was so incensed (at what he believed was bad advice) he wrote his own version. We're happy to publish it.

SECURITY PART ONE

Protecting your home network

There's a lot of advice given to consumers on how to secure their PCs and home networks. Security consultant **Phil Kernick** reckons a lot of it is wrong. Here are some of his top tips for securing a home network.

APC EXPERT

PHIL KERNICK

Phil Kernick has 19 years of experience in information security and technology. He has focused on information security for the past 11 years and has CISSP and Cisco CCSP security certifications. Working for CQR Consulting, Phil specialises in the areas of information security architecture and strategy, and his engineering background has provided a focus for protecting the SCADA assets of critical infrastructure businesses.

WHAT'S NEXT?

PART 2

JANUARY '10
MORE SECURITY TIPS

Phil Kernick continues his tips on how to protect your network.

There is a lot of security advice available both online and in printed magazines, and while much of it is excellent, a significant quantity is not only wrong, it's so bad that if you follow it you will end up worse off than if you'd done nothing.

But if security isn't your business, how are you supposed to be able to tell the good from the bad? To make it easy for you, we've put together the top 10 techniques for securing your home network, and included in each not only the way to do it right, but examples of security snake oil to be avoided.

1 UPDATE EVERYTHING

It's amazing how much pain and inconvenience these two simple words can save you. It's also amazing how many people just don't do it right, or don't do enough of it.

To start with, Windows Update is your friend — it will automatically check all of your Microsoft products and provide patches to fix known vulnerabilities. Microsoft usually makes patches available on the second Tuesday of each month, but you can check any time. Chances are you are already automatically checking as this has been the default since XP SP2, and if you don't, the Security Centre will report a red alert in the notification area. However, this doesn't mean you've installed them. Configure Windows to automatically download and install any updates. If you are asked to reboot, just do it, as the update isn't applied until the reboot happens.

Next, if you have an iPod — and let's face it, most of us do, then you have iTunes and perhaps you've played with Safari. Here's where Apple Software Update is also your friend. This will do for your Apple applications what Windows Update does for your Microsoft applications. The only difference is that it doesn't run automatically in the background. You'll need to check manually every month, or configure iTunes to look for updates when it starts (Edit > Preferences > General > Check for updates automatically).

Finally, it's time to update all of the standalone applications that either talk to the internet or get files from the internet. This includes Adobe Reader, Mozilla Firefox, Mozilla Thunderbird, Skype, all of your browser plug-ins and many others. Most applications now have a 'Check for updates' option in the Help menu. Use it. Don't ignore requests to update your applications.

If you have installed applications in the past but no longer need them, uninstall them. That way you don't have to worry about updating them.

All of this may seem like a pain, but it is what it takes to stay safe, as most attackers are attacking known vulnerabilities. If your software doesn't have a vulnerability, an attack against it can't hurt you.

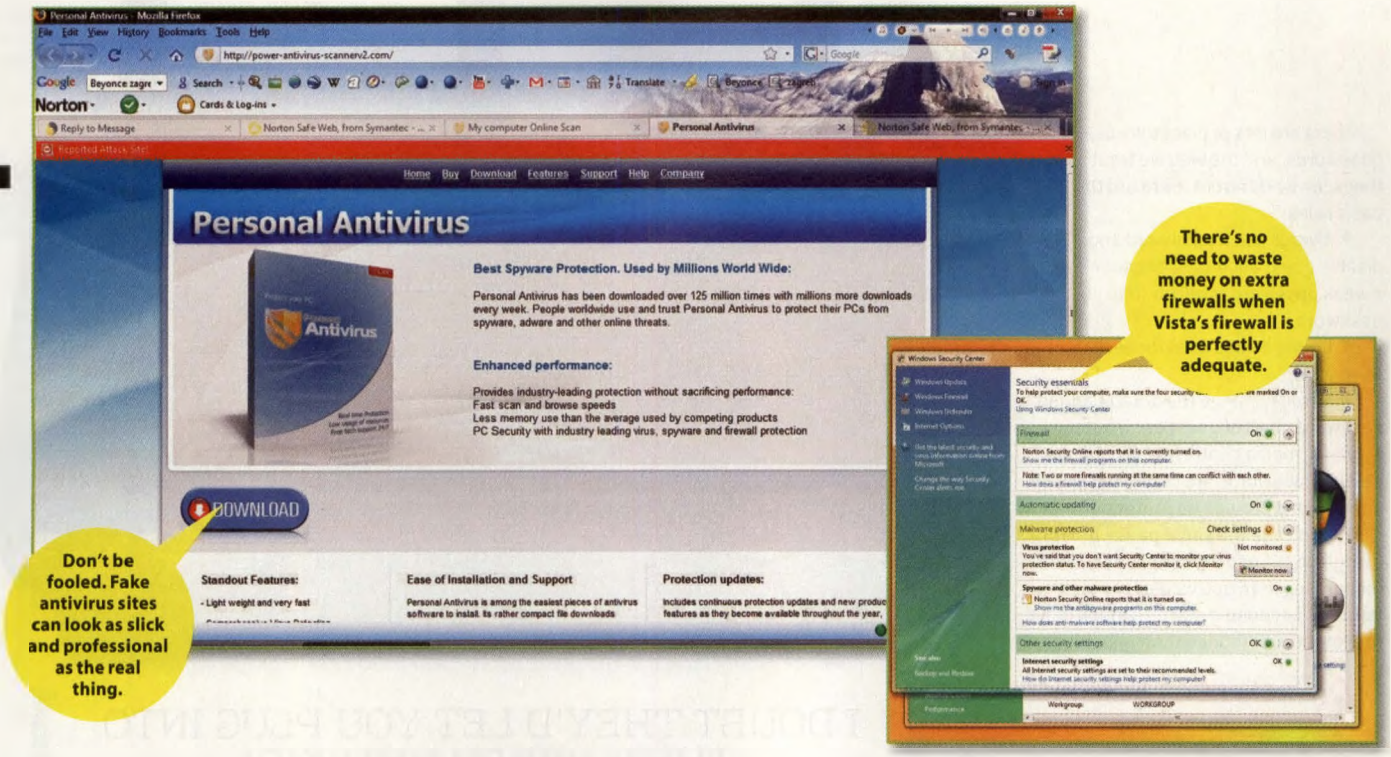
SNAKE OIL WARNING!

Any web page that has a flashing graphic that says "your software is out of date, click here to fix it" is dangerous. There is absolutely no way that the web page could determine anything about any of your software. If you click on the image you will be infected with something nasty.

2 USE A GOOD ANTIVIRUS PACKAGE

It isn't enough to just use the antivirus package that came bundled with your PC when you purchased it. While the software is still running, unless you've paid for a subscription or are using one of the excellent free products, you will only be protected from the threats that the AV company knew about when it was installed.

There are more than 25,000 new pieces of unique malware detected by AV companies each day, so unless


Personal Antivirus
Best Spyware Protection. Used by Millions World Wide:
Enhanced performance:
DOWNLOAD
Standout Features:
Ease of Installation and Support
Protection updates:
Don't be fooled. Fake antivirus sites can look as slick and professional as the real thing.
There's no need to waste money on extra firewalls when Vista's firewall is perfectly adequate.

you stay up to date, you'll be worse off than not having any protection because you'll think you're safe when you are not.

Now that Microsoft has released Security Essentials for free for Windows XP, Vista and Windows 7, there really is no excuse for not having an antivirus product installed and enabled. It may not be as full featured as some of the other security suites, but it will do all the basics needed to keep you safe.

Always allow your AV software to update its signatures, and regularly run a complete scan over your entire PC. Configure your AV software to check any removable media (USB key, DVD, etc.) when it is plugged in. It's too late to update your AV after you've been infected with something nasty, and you might be left with a complete system rebuild ahead of you.

If your ISP offers you the ability to scan your incoming emails for malicious content before they hit your mailbox, turn the feature on. It will almost certainly cut down on your spam as well!

SNAKE OIL WARNING!

Any web site that tells you your AV is out of date and says 'click here to fix it' is going to infect you with something nasty. There are estimated to be 10,000 fake AV sites on the internet where you can pay money to be infected with malware. Good AV products have been reviewed by a reputable print magazine, and probably come in a box!

Another thing to avoid is anything that claims to be an online AV scan. The only way these could in theory work is that they download something to your PC that runs as administrator and scans all your files. But given the number of fake AV web sites there are, you are much more likely to get infected than cleaned up. Just say no to online scans.

3 USE A FIREWALL

It will come as no surprise to most people that the internet is full of nastiness just waiting to get the opportunity to attack your nice PC. Some of that nastiness is directly targeted, but the vast majority is automated. Just being connected can be enough to get you in trouble. A firewall is a shield that protects your computer from most of the attacks by blocking access to network ports.

There are two types of firewall that can protect you: a hardware firewall and a software firewall.

If you have recent ADSL or cable internet, a hardware firewall will almost certainly be built into you router. It stops attacks even getting near your PC or any of your other devices. Make sure you don't enable the ability to configure the firewall remotely as this will give attackers another way to directly target your network. If you only use mobile 3G internet services, unfortunately you don't have a hardware firewall as an option.

Everyone has access to a software firewall as they have been a standard part of Windows since XP SP2. It is a piece of software that runs on your computer, actively blocking access to network ports. The main limitation with a software firewall is that it is just software — it can be turned off, it can have vulnerabilities, and every piece of malware will disable it if they ever do get onto your PC. Turn it on and leave it on.

SNAKE OIL WARNING!

Most ADSL and cable routers come with a large number of extra firewall options. These involve things like DMZ machines, packet filters, intrusion detection and a host of other settings. They are all about protecting the internet from you, not you from the internet. If you enable them, you will make your life harder as some services will stop working, and you won't make yourself any safer.

Spending money on a better software firewall than the one that comes with XP SP2 or Vista is a waste of money. They are both perfectly functional, and they will both protect you from most attacks. The Vista firewall is better — not because it also blocks outbound connections — but because it is network aware, and will increase your protection when you directly connect to the internet, but relax it when you are home or at work behind a hardware firewall.

4 USE GOOD PASSWORDS

Most people lock their car when they get out of it, whether it is at the shopping centre carpark or in their own driveway. This stops those who aren't permitted access to the car from stealing your stuff when you are away. That's all a password is — a lock to stop unauthorised users from stealing your stuff. Most people have much more valuable information on their PC than in their car, but amazingly don't lock it up.

Make sure you have the right router security in place unless you want to share with strangers.

There are lots of places we use passwords, and the way we treat them can be different. Here are the basic rules:

- Always use a password and disable guest accounts, because even a weak password is better than no password.
- Create a password for each user of your PC.
- Always change the default admin password on all of your gear (router, wireless, media centre, etc.), because default passwords are published on the internet and provide no protection.
- Don't use the same password for everything — use a stronger password for banking than you would for a web forum — because it matters much more to protect your money than your blog.

SNAKE OIL WARNING!

For your home systems you don't need a password that is incredibly long and complex, and you don't need to change it every few months. That's just making life hard. In the same way that you don't use uncopyable restricted access keys for your house and car, you don't need military-grade security at home — just don't make your password a word that appears in a dictionary.

5 PROTECT YOUR WI-FI

You don't need to worry too much about an attacker getting access to the blue ethernet cables you run around your house, as they'd first have to get into the house. But when you install a wireless access point, you are effectively putting an ethernet cable on the street for anyone to use. It's incredible the number of people who don't enable any security or use broken security like WEP in their wireless networks — I doubt they'd let you plug into their wired network if you knocked on their front door.

There are lots of acronyms in wireless networking, but there is only one you need to remember — WPA (Wi-Fi Protected Access). There are two versions of WPA: WPA1, which is backwards-compatible with older wireless hardware but not entirely secure; and WPA2 which is currently considered secure and unbreakable, but it's not backwards-compatible.

If possible, enable WPA2 on everything. If you have some older equipment that doesn't support WPA2, you'll need to downgrade all of your equipment to WPA1 to support it. Given that there are a number of new and interesting attacks being published on WPA1 it's probably a better idea to replace the old equipment, just to be sure. You need to be running at least XP SP2 to get WPA2 support.

> I DOUBT THEY'D LET YOU PLUG INTO THEIR WIRED NETWORK

When configuring WPA you need to provide two things to the access point and to all of the computers that will be connecting to it: an SSID and an encryption key. The SSID is the network name and will be visible to anyone with a wireless card in a notebook, so change it from the default to something that is meaningful to you but not to others, but remember it isn't a password and it isn't secret. The secret part is the encryption key. Don't think of this as a password because unlike passwords, it really does need to be very long and complex. That doesn't mean it has to be impossible to remember. Use a sentence with punctuation for the key, something like 'This is MY encryption key!!!' would be a good choice.

SNAKE OIL WARNING!

There is unfortunately a lot of snake oil about wireless security. Here is a list of things that don't help and can make things worse for you:

SSID masking: trying to be invisible by disabling SSID broadcasting is pointless, because the SSID is transmitted when a computer connects to a wireless network. It may not be automatically broadcast, but it will be detectable. Not only that, but XP notebooks will probe all of the SSIDs that they have ever been connected to as they have to actively detect wireless networks rather than letting the network announce itself. There are some very clever attacks that take advantage of this to compromise your notebook. Vista fixed this problem and by default doesn't probe. Hiding your SSID is just bad security.

MAC filtering: every single IP packet that your computer sends to a network includes the MAC address of its network card. It is transmitted in the clear, no matter what security you are using to protect your wireless network. Even the simplest network scanning tool can extract this information, and there are plenty of free tools that will allow you to change your MAC address. So if you enable MAC address filtering to try and keep an attacker out, all they have to do is scan the network, find a MAC address that is permitted, and then change their MAC address to match it. Now they have bypassed your security. All MAC address filtering does is create more work for you and in the end, makes you no more secure. Don't bother with it.

Turning down the power: some people think that by turning down the output power on their access points they will be harder to detect. This sounds like a good idea, but assumes that the attackers only have access to tiny antennas. With wireless scanning it really does matter how big your antenna is.

Most attackers will have access to very large antennas which will detect anything you send. Turning down your power just makes it harder for you to use your own network, and doesn't make it more secure. With wireless, louder is better.

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110 downtime

HIGH-PERFORMANCE PLAYTIME

01 CRUMPLER CAMERA BAGS

Crumpler Bags is an Australian company that has really made a name for itself over the quality and strength of its products. The 'Million Dollar Homes' range comes in eight sizes and five colours, offering an ultra-safe, padded environment for all your photo and video equipment. The brushed polyester lining with fully configurable dividers and supports means you can customise the bag to snuggly fit your gear. The outside of the bags are made with a waterproof fabric so your gear is guaranteed to stay dry. To top it all off, an ergonomic neck strap developed in partnership with Canon CPS makes them comfortable to carry. ***CZ***

CONTACT	Crumpler
ONLINE	www.crumpler.com.au
PRICE	$53 - $220

02 PLANTRONICS VOYAGER PRO

Two noise-cancelling mics on a boom utilise Plantronics' AudioIQ2 technology with its adaptive 20-band equalizer to ensure the best sound possible in even the noisiest situations. It offers great sound and clear reception that more than makes up for its bulky size. Despite being a bit large, the Voyager Pro is extremely comfortable to wear and fits nicely behind the ear. A pivoting mic boom lets you wear the headset on either ear and also allows users to optimise the position of the microphones for better sound. Power isn't a problem as the unit offers up to six hours of talk time and five days of standby from a single charge. If only it was PS3 compatable. ***CZ***

CONTACT	Plantronics
ONLINE	www.plantronics.com.au
PRICE	$159

03 THE POD BEANBAG TRIPOD

This new range of lightweight, flexible bean bags come with a standard quarter inch camera mount thread so you can attach anything you want to it, from a compact camera to DSLR or a Pro Camcorder. Simply attach your camera and The Pod becomes a stable platform that you can use on any surface. Perfect for long exposures or shooting in dim light. The Pod is available in 3 sizes, each of which has an on and off-centre camera mount for use with larger devices or telephoto lenses. It's ideal for all those times that you are either unable or not allowed to use a tripod. The Pod is cheap and simple and makes the common tripod obsolete. ***CZ***

CONTACT	Adeal
ONLINE	www.adeal.com.au
PRICE	$29.95 - $79.95

04 A-DATA SH93 HDD DRIVE

Designed for students and the outdoors person, the SH93 is a weatherproof and shockproof external HDD. Incorporating a rubber-plastic mix body and special cushioning materials, the SH93 has passed the 1 metre for 30 minutes waterproof test as well as passing the US military standard MIL-STD-810F drop test, so you know it's got to be tough. Besides being waterproof and shock tolerant, the SH93 is designed for style and portability.The USB cord is conveniently stored in a slit on the side of the drive to avoid damage and tangles. The SH93 is available in red and yellow in a choice of 320GB, 500GB or 640GB capacities. ***CZ***

CONTACT	A data
ONLINE	www.adata-group.com
PRICE	TBA

KODAK EASYSHARE D830

05

The problem with digital frames up until now is once you've bought one, you're stuck with your chosen design. The D830 gets around this problem with a selection of interchangeable frames to suit your mood or decor. With 512MB of internal memory, there is room to store up to 4,000 pictures. Plug and play memory card and USB connections allow for even more storage and simpler access to your images. The Quick Touch Border with automatic motion sensor lets you scroll through your photos for display or editing right on the frame. A dynamic collage mode also allows you to view several pictures at the same time. Handy! *CZ*

- CONTACT Kodak
- ONLINE www.kodak.com.au
- PRICE $249

SONY ICFCL75IP IPOD DOCK/FRAME

06

Why settle for a simple iPod dock that only plays music when you can grab yourself a combined iPod dock, picture frame / video screen, alarm clock and digital radio? Sony's ICF-CL75iP alarm clock has a buit-in 7-inch WVGA screen that allows users to not only wake up to their favourite songs but their favourite videos as well. 1GB of internal storage (plus a USB port for expandability) offers a whole library of bedside entertainment. This won't go quite as far as replacing the spare TV in the bedroom but the ability to watch digital content on such a compact unit does have its appeal. And at less than $150 it does offer a tempting array of functions. *CZ*

- CONTACT Sony
- ONLINE www.sony.com.au
- PRICE $149.95

TARGUS T.A.N.C. CASE

07

The Targus T.A.N.C (Targus Armoured Notebook Case) for students was designed in conjunction with Dan Morgan, an Australian inventor who won the grand final of ABC's new inventors in 2007. Designed for the rough and tumble of student life, and made to fit inside school bags, the T.A.N.C. utilises a patented combination of layered padding to enhance the protective shell. T.A.N.C. features heavy-duty fittings and zippers, in addition to D-rings which can be personalised with tags or key-charms. So if you have a kid that is a little rough with their technology, T.A.N.C. will increase their notebooks chances of survival. *CZ*

- CONTACT Targus
- ONLINE www.website.com.au
- PRICE $64.95

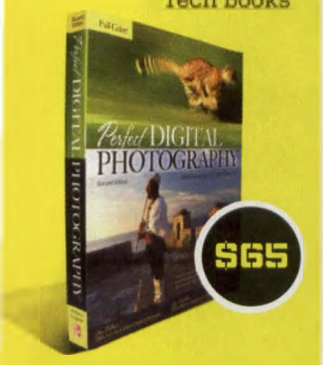
WHY CRY BABY ANALYSER

08

We're not too sure about this one but we thought it was worth a look. The Why Cry Baby Analyser promises to be able to analyse your baby's cry, and after twenty seconds, tell you which of the five key cries your child is using. Its in-built frequency analysis technology will tell you if your baby is stressed, sleepy, annoyed, bored or hungry and display the result on an LCD screen. The analyser is portable and comes with a symptoms chart and guide with tips on how to properly stimulate your child's development. The jury is still out on this one but for first time parents it couldn't do any harm to give it a try. Maybe. *CZ*

- CONTACT Why Cry?
- ONLINE www.whycry.com
- PRICE US$75.99

Inprint
Tech books



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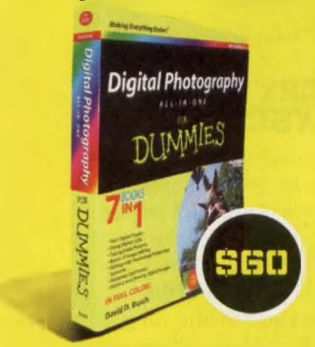
www.mcgraw-hill.com

A Pulitzer Prize-winning photographer and an Adobe Photoshop Expert guide you through the entire photographic process, from composition to printing and archiving. The expert techniques inside this guide help you improve both the quality of your photographs and your proficiency in the digital darkroom.



DIGITAL PHOTOGRAPGHY FOR DUMMIES
www.wiley.com.au

Provides help in choosing the right camera, how to compose and capture great photos as well as loading them onto your computer and enhancing them with Photoshop. Getting the best results for printing is a handy inclusion that is often ignored. Paint Shop Pro, Corel PhotoPaint and PhotoImpact, also get a look in.

Powermat

The age of wireless electrical connections is here! Well, almost.

With everything going wireless it seems almost archaic that we still rely on rubber coated strips of metal to power our technology. Since the advent of the portable device, the endless task of having to find and untangle chargers has been the bane of every gadget enthusiast. Finally, that all looks to be a thing of the past.

Originally invented in Israel, Powermat sees the dream of charging electrical devices wirelessly, come true. Pretty much. What must be kept in mind is the fact that this is the first generation of a technology that is sure to introduce drastic changes to the way we use electricity. All it needs is the co-operation of device manufacturers to reach its full potential.

Powermat utilises the principles of magnetic induction to safely and effectively provide power to electronic devices. Electromagnetic induction is the production of voltage across a conductor situated in a changing magnetic field. In the case of Powermat the conductor is the receiver on the device that is placed into the moving magnetic field that is generated by the Powermat itself.

In future generations, the conductor/receivers will be built in the devices during production. Until then though, Powermat utlises separate receivers that are attached to the devices to be charged. Either a leather cover or new battery doors for phones and hand held gaming devices or wireless mounts for iPods and MP3's. Once these receivers are attached to the devices, the device itself only needs to be placed on the mat to recieve a charge.

Powermat claims that devices will charge as fast, if not faster than conventional means, even when the Powermat is charging three devices at once.

Once the receivers are fully integrated into new devices, Powermat sees whole desktops or kitchen counters being used as wireless charging surfaces. Prototype offices and kitchens have already been setup where appliances (including PCs) can be placed in 'live areas' where they work without cabling. The world's first wireless power outlet, that can be moved around a counter top to wherever the user wishes, has already been tested and is ready for production. All we need now is for appliance manufacturers to jump onboard and we can say goodbye to power cables altogether.

Christopher Zammit

.: CONTACT Powermat
.: ONLINE www.powermat.com
.: PRICE US$99.95

50 WORDS
. . .why you should win.

It's that time of year and the summer blockbusters are upon us. Our friends at Paramount Pictures have come to the party with 5 movie packs to give away. Each pack contains a DVD copy of three of the biggest movies of the year including Star Trek, Transformers: Revenge of the Fallen and G.I. Joe: The rise of Cobra. All you have to do is tell us in fifty words or less why you deserve to win. It's that easy.

Entries close December 16th. Winners will be contacted by email.

Email your entry to:
downtime@acpmagazines.com.au

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MUSIC DOWNLOADS

Although CD sales still exist, most tech savvy MP3 users prefer to get their music via downloads from the web. Sites like iTunes, Amazon MP3 and eMusic have seen great growth even despite the popularity of illegal torrenting sites like Pirate Bay and MiniNova. I guess most of us have morals after all.

What's hot & not

TECHNOLOGY THERMOMETER

SANDISK SLOTMUSIC

Released in 2008, Sandisk's SlotMusic was designed as a means to buy an album on a packaged SD card. For US$15 you get a 1GB card with one album already installed. Sales have been miserable with many music users having never even heard of SlotMusic.

BLU-RAY PICKS OF THE MONTH

TRANSFORMERS 2

CONTACT Paramount Pictures
ONLINE www.paramount.com
PRICE $42.95

Transformers: Revenge of the Fallen is one of those great cinematic FX-fests that is made to be watched on Blu-ray. Anyone familiar with the original film will know the level of quality and detail that has gone into the film's special effects. Transformers 2 improves on the original as far as popcorn entertainment and visual eye-candy is concerned. Set two years after the original film, Michael Bay directs the sequal that sees a race of ancient Transformers return to Earth in a bid to steal the sun's power. Cue awesome robot/human battles and some of the best action sequences of the year. ***CZ***

TERMINATOR SALVATION

CONTACT Sony Pictures
ONLINE www.sonypictures.com.au
PRICE $44.95

The Terminator franchise gets a much-needed kick in the pants as we finally get to see the part of the story we've all been waiting for... the battle between the humans and the machines in the post-apocolyptic future. John Connor is now in his mid-thirties and is leading the human resistance against the machine uprising. His meeting with Marcus (Sam Worthington) and his eventual 'disagreement' with Kyle Reese, his future father, gives *Terminator Salvation* a deeper character-based story than its predecessors. Match that with amazing effects and great action sequences and you have one hell of a movie. ***CZ***

I LOVE YOU MAN

CONTACT Paramount Pictures
ONLINE www.paramount.com
PRICE $39.95

Dealing with the issues of male friendship rather than male sexuality, *I love you man* is an original concept in which a lonely real estate agent goes on the search for a best man for his upcoming wedding. This film deals with all the issues surrounding male friendship, such as masculinity, discussing taboo subjects and how to show affection (without looking gay) to your male friends. *I love you man* is actually a very funny movie and has some great characters and moments. Paul Rudd (from various Judd Apatow films) gives an excellent performance and makes this film the comedic success it is. ***CZ***

ANGELS AND DEMONS

CONTACT Sony Pictures
ONLINE www.sonypictures.com.au
PRICE $44.95

The Pope has died, and before the Vatican Conclave can nominate his successor, the four primary hopefuls for the Papacy are kidnapped. A threat to kill the priests, along with the complete annihilation of Vatican City, is issued as an elaborate revenge scheme for a persecuted group known as the Illuminati. Robert Langdon (Tom Hanks) is hired by the Vatican to follow the clues left by the kidnappers and stop a mysterious new weapon from being used. Filled with all the clues, history and tension of *The Da Vinci Code*, *Angels and Demons* is intelligent entertainment, with a spattering of suspense and action. ***CZ***

Bruno is Blu 2 Go!

Use your iPhone or iPod Touch as a remote to access exclusive Bruno Blu-ray features!

After the success of *Borat*, Sacha Baron Cohen returns as his latest character creation, *Bruno*. This hit mockumentary sends up the fashion industry as Bruno runs amok in one cringe-worthy scene after another.

Now available on Blu-ray, Bruno has an extra feature in which owners of the film can now access exclusive special features via their iPod Touch and iPhone.

All you have to do is download the Blu 2 Go app from the apple iStore, put the disk in your player and off you go. Your iPhone will then act as a remote in which you can navigate, watch and store content on your phone.

Christopher Zammit

CONTACT Apple
ONLINE store.apple.com/australia
PRICE TBA

Quikfix

New releases

PROFESSOR LAYTON AND PANDORA'S BOX

Wisely, in our opinion, Nintendo has not let *too much* time elapse before releasing the second title in the fantastic Professor Layton adventuring/puzzle-solving series. This time around, the Professor and Luke are charged with uncovering the secrets of the supposedly deadly 'Elysian Box' — expect many a plot twist and puzzle along the way. Available on the DS for $69.95.

IPHONOPOLY

For a little under $6 players can get greedy on-the-go in EA's iPhone-ified Here and Now Edition of Monopoly. Playable for up to four players over Wi-Fi or go it solo against a few AI bots. If it's the computer you're up against, there are three difficulty settings depending on how challenged you want to feel. Available now via the App Store.

Scribblenauts

Peter Dockrill, loquacious as ever, gets scribbly.

Scribblenauts is a 2D puzzle platformer, with the emphasis squarely on puzzle over platform. You play Maxwell, a rather charming little character who has to — *get this* — retrieve a star (or 'starite') from each level in order to move onto the next. Okay, so no big surprises so far, but there is something different (and pretty revolutionary) in Scribblenauts. At the heart of the game lies a simple but somewhat magical gameplay innovation: in order to help Maxwell achieve his goal, you have to *imagine* what he needs and then write it down, and lo, it will appear! Maybe it's a ladder, maybe it's a saw, maybe it's a boulder, a rope or a gun — whatever it is, you just write it down, it will materialise and you'll find out if it's the right tool to help Max out. Discovering the lexicon of the game recalls adventure games of old, and with 'tens of thousands' of objects in the database, Scribblenauts can't be faulted when it comes to comprehensiveness. Perhaps, though, the execution could have been a little neater. The graphics are cute, the music is bouncy and the core idea is excellent, but the levels can be erratic (some are too obvious, others inconceivable) and there's a fair amount of repetition. All up, it's some good lateral fun if you want something different.

WHAT'S ON YOUR MIND?
If you write it, he will come... Scribblenauts rewards scribblers by making their words reality.

AVAILABLE PLATFORMS: PC-DVD, Wii, PS3, PSP, XBOX 360, NINTENDO DS

CONTACT	Warner Bros. Interactive
ONLINE	www.games.kidswb.com
PRICE	$59.95

✔ Imaginative, innovative 'write whatever you want' concept.

✖ A little repetitive and frustrating; doesn't live up to its promise.

VERDICT ★★★½☆

Watchmen: The End is Nigh

Troy Coleman changes the catchy phrase from the comic to: who *plays* the Watchmen?

I don't need to explain what or who the Watchmen is right? Everyone has read the comic? If not, you now have some homework to do. The End is Nigh follows the story of the crime-fighting duo Rorschach and Night Owl out-on-the-town and pounding bad guys shortly before the introduction of the Keene Act (basically outlawing super-heroism) in 1977. Playable in either single player or cooperative, players take on the role of either of our protagonists (AI filling in the blank for all the single players out there) and smashing the buttons of various system controllers through to the end credits. Both characters have different abilities and there is often times where players need to cooperate to solve incredibly simple puzzles, but more often than not you're just mashing off against waves of sinister looking hoodlums. Yawn. The guys at Deadline Games (Chilli-con-carnage and the upcoming Faith and a .45) have managed to inject enough Watchmen flavour and branding in there for it to pass muster but there's no hiding the title's secret identity as an unpalatable, generic money-spinner. Unfortunate.

AVAILABLE PLATFORMS: PC-DVD, PS3, XBOX 360

CONTACT	Warner Bros.
ONLINE	watchmenvideogame.com/
PRICE	$49.95

✔ Certainly some nice Watchmen flavour but it's just a...

✖ ...generic, boring button masher. Lucky it's cheap.

VERDICT ★★½☆☆

V FOR VIGILANTE
Watchmen is set back in the day — and unfortunately it plays like we're still there: Double Dragon without the charm.

Indepth
Sharing a moment

Halo's longevity stems largely from its absolutely rabid multiplaying-machinima-making fan-base, so it really wouldn't be Halo if there wasn't something new for the masses to obsess over. ODST's answer? Firefight. Basically a cooperative survival mode for up to four players, Firefight throws players straight into the action against wave upon wave of enemies, which for my money, is a bit meh. But for a bit of original Halo flavour, ODST also ships with a second disc jam-packed with all the existing multiplayer maps, the Legendary, Heroic and Mythic map packs, as well as three new maps exclusive to ODST. Good fun.

Fancy a Firefight? No? (How about a nice cup of tea then?)

The latest addition to the Halo franchise mixes up the formula a little: but if only it stuck around a bit longer.

HALO 3: ODST

Troy Coleman knows it's always up to the rookie to win the war.

A self enforced marketing blackout during the build up to the release of Bungie's latest addition to the Halo stable, ODST (Orbital Drop Shock Trooper), meant that, come release, I genuinely had no idea of what I was about to experience. Eight years of preconception and franchise expectations gave the impression I'd already seen the finishing credits, but seven or so hours later — yes it really is that short — my preconceptions had been smashed, or blasted or... something appropriately Halo-ish.

The entire affair takes place during the Covenant's invasion of New Mombasa and everything prior to Master Chief's return (Halo 3). Players assume the role of the rookie in a first-to-respond, elite special-forces team under the command of a Naval Intelligence agent with an — at the time — unknown agenda.

Events take a turn for the worse and players find themselves on terra firma and separated from the rest of the team. From here on, it's up to you to discover what fate befell the other team members.

While the main protagonist is the rookie, players get a chance to play through the eyes of the entire team through what are essentially playable cut-scenes that are all set to a unique and beautifully atmospheric soundtrack. Never fear; the core gameplay remains true to the franchise; ODST is still an accessible, more-or-less on-rails FPS devoid of over-complicated combat mechanics, but the exploration, narrative and soundtrack push ODST into another place entirely. This is the Halo I have been waiting to play for years; I just wish it was a bit longer.

.: AVAILABLE PLATFORMS
PC-DVD | Wii | PS 3 | PSP | XBOX 360 | NINTENDO DS

.: CONTACT Microsoft
.: ONLINE bungie.net/Projects/ODST/
.: PRICE $99.95

✔ The Halo we've been waiting for...

✖ ...ended quicker than we'd hoped.

.: VERDICT ★★★★☆

Toshiba recommends Windows Vista® Business.

intel Centrino 2 vPro™ inside™

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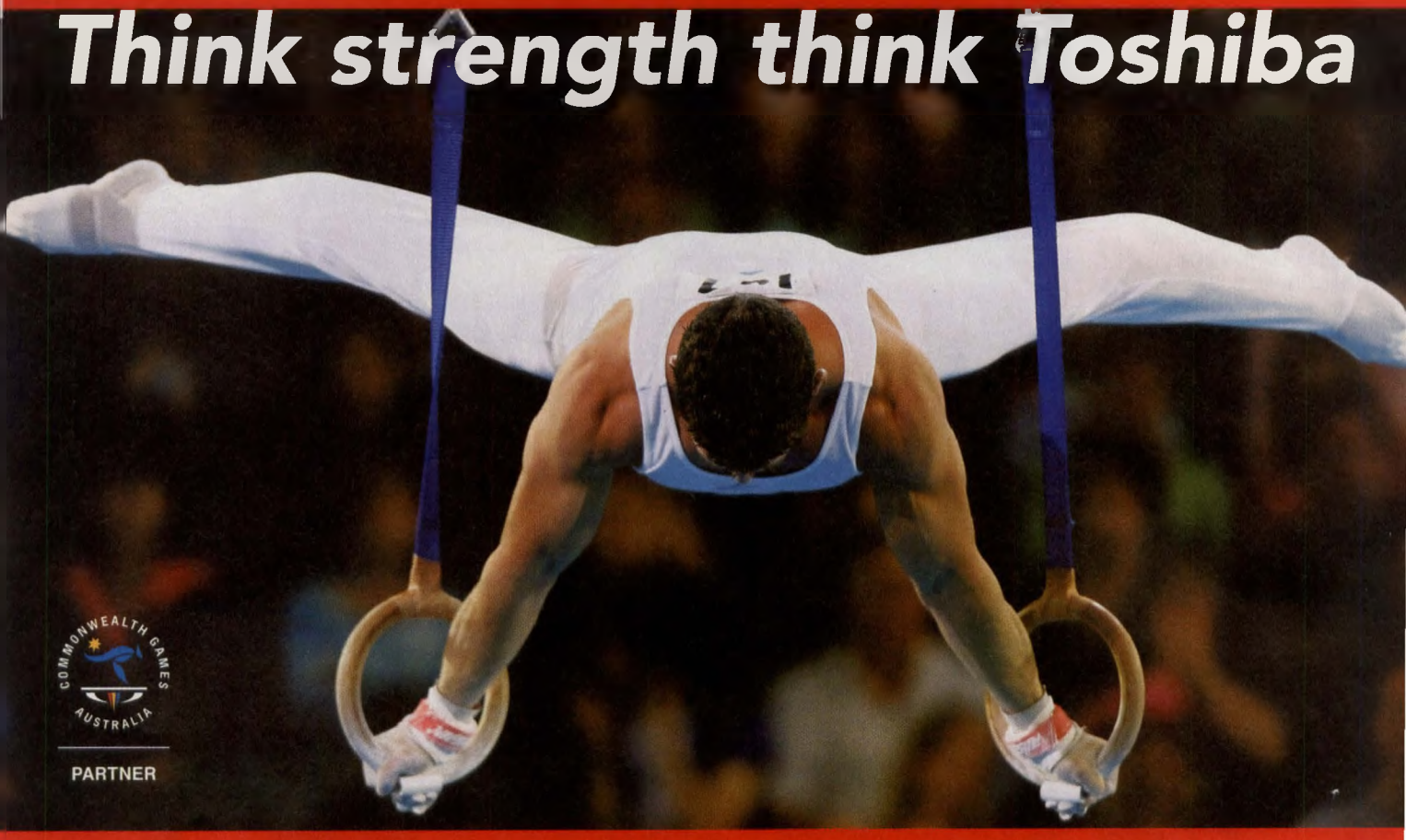

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Tecra R10

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TOSHIBA

Leading Innovation >>>

chipchat

BY PETER DOCKRILL

Take back what's yours!

When it comes to naming your organisation or collective, it's important to think about the *tone* you're trying to achieve: for example, a 'society' or 'association' is decidedly more passive-sounding and less politically challenging than a 'union' or 'party'. But perhaps of all the most provocative titles for your posse, the 'liberation front' is the most daring — it implicity connotes a wrong to be righted and lets everybody know whose side you're on. Which is why, in this Web 2.0 day and age of email, documents, social networking and online backup, we're quite taken with (*and* a little amused by) the moniker of the 'Google Data Liberation Front' (**www.dataliberation.org**), a Google engineering team whose goal is to make it as easy as possible for you to move your data in and out of Google products. It's a noble pursuit — and an important one, given the huge amount of personal information the company now commands — but we really wrote this story 'cos we just get a kick out of that name. Migrating your email never felt so Charles Bronson.

And the winner is. . .

Power: who wields it, and why — and how? It's a pretty open question, and one that could support a lot of different kinds of answers depending on the context given. But in this digital era, where so much information is conveyed and distributed online, a pretty pertinent answer is: the hacker. Online security dramas that dominate the media focus on issues pertaining to largely financial-related cyber-crime: malware, phishing, password security etc. But another kind of hacker community exists, one which is more subtle, discreet and enthusiast in nature, but which still makes itself known from time to time — and wields tremendous power when it wants to. If you want to read a fascinating story about a bunch of such individuals — who decided to embed a hidden message in the results of *Time.com*'s 100 Most Influential People online poll — head over to *http://tinyurl.com/cn9gk5*. Very interesting stuff indeed.

Incandescent magma?

When it comes to stylishness and external hard drives, there's only one name in the game: LaCie. LaCie has been at the forefront of cutting-edge enclosure concepts for years now. It's brought us the visionary works of many experimental and industrial designers, and now the company's latest is upon us: the Starck, from Phillipe Starck. We'll let the designer speak for himself on this one: "Technological genius explodes exponentially, each time with incredible power whose limits are yet to be known. The power remains, never abating, symbolically characterised by the sculptural magma that one attempts to cleave, to master within this geometrically perfect strongbox. A symbol of strength mastered, of freedom guided, of incandescent magma heeding to the form of its cast. The interpretation is free. But the mystery remains." apc

LACIE — OR LOONY?
We're all for 'creative' product descriptions, but LaCie's latest takes the cake. It's a *hard drive*, people.

AYWUN

CASES - PSU - COOLING TECHNOLOGY

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QLD

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Netplus Micro Computer	08 9242 7288	netplus.com.au
RTV Computers	08 9325 6666	rtvcomputers.com.au
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Advance IT Solutions Ltd	09 280 3240	advanceit.co.nz

AUCKLAND CENTRAL

Gamma Computers	09 377 2222	gamma.co.nz
XP Computers	09 529 9196	xpcomputers.co.nz

AUCKLAND NORTH

Expert Infotech Ltd	09 443 1786	elnfo.co.nz
Ezone Computer Takapuna	09- 4886692	ezonecomputers.co.nz
ITServe International Ltd	09-4185168	itserve.co.nz

AUKLAND EAST

PC Force	09 579 2555	pcforce.co.nz

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Extreme PC	09-8494888	extremepc.co.nz
QMB Computers Mount Roskill	09-621 1628	qmb.co.nz

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Oliffs Computers	03 343 3865	oliffs.co.nz

WELLINGTON

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PC Patch	04 568 6885	pcpatch.co.nz
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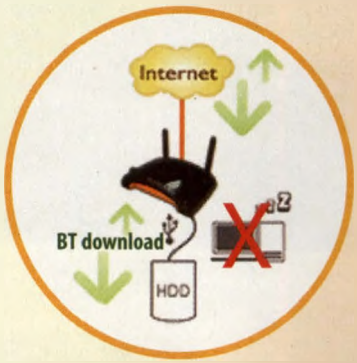

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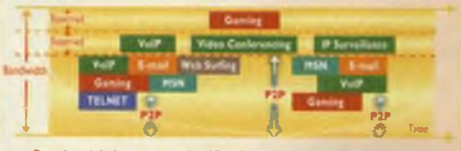
TurboNAT (Max. 95Mbps)

iDBM (Intelligent Bandwidth Management)



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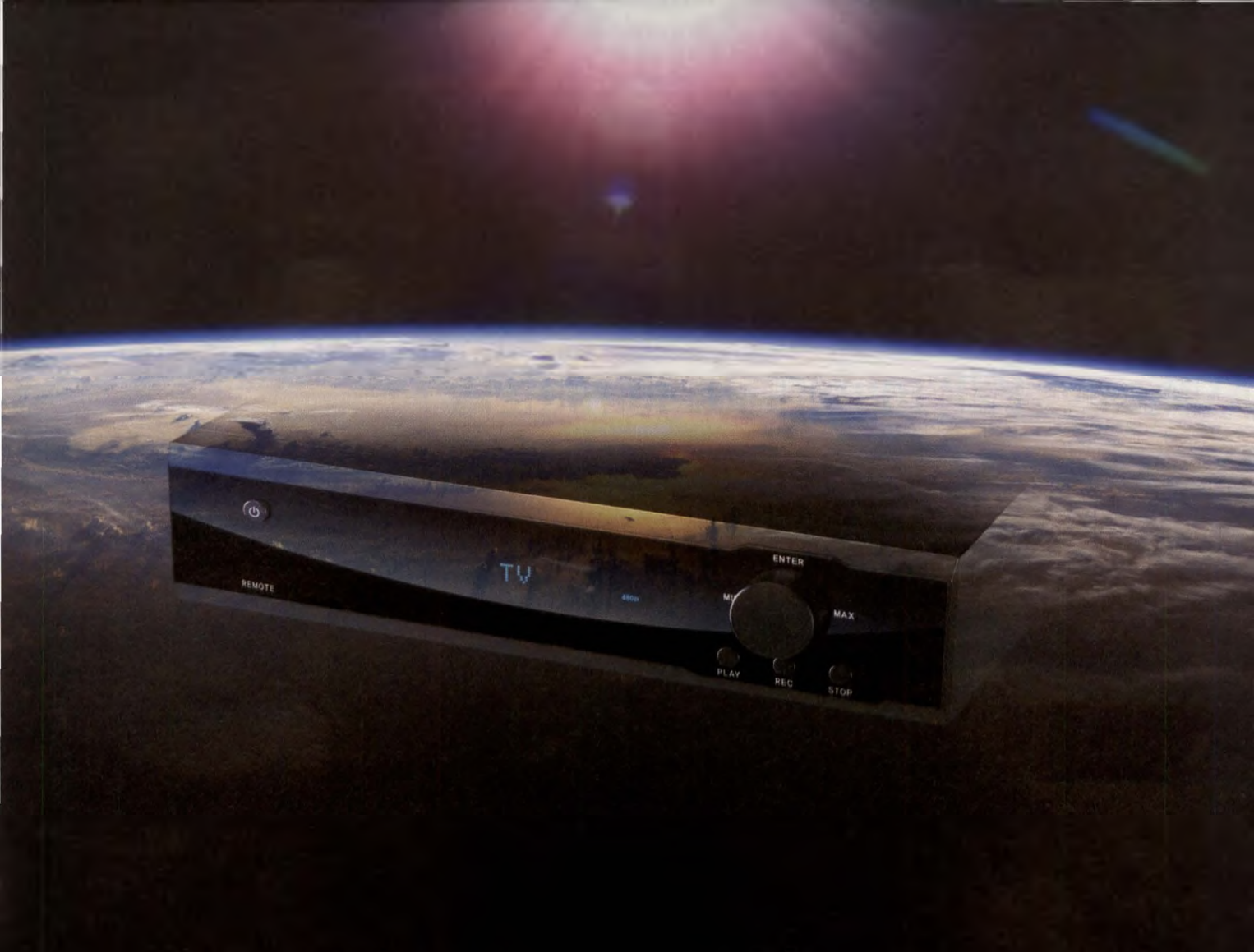

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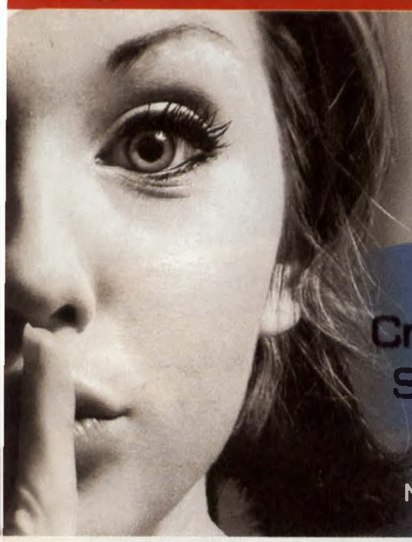

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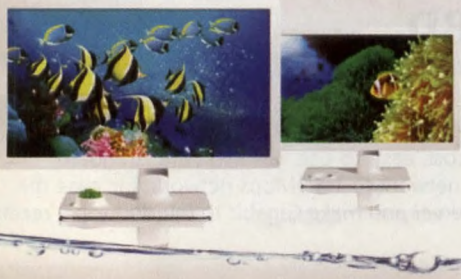

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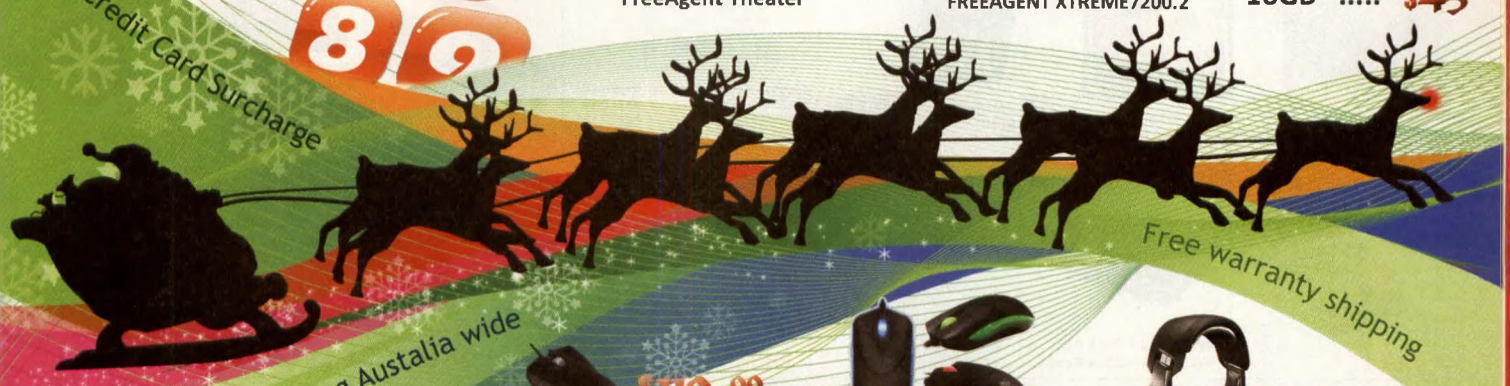

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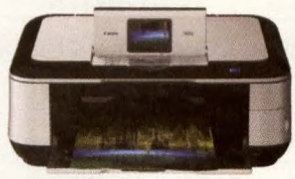

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Model	Genuine	TONNY
EPL-5700/5800	$196.00	$ 49.00
EPL-5900/6100	$213.00	$ 49.00
EPL-6200	$163.00	$ 49.00
AL-C900/1900BK	$102.00	$ 65.00
AL-C900/1900C/M/Y	$220.00	$ 65.00
AL-CX11N/C1100BK	$107.00	$ 39.00
AL-CX11N/C1100C/M/Y	$164.90	$ 39.00
AL-C1000/2000BK	$124.00	$ 99.00
AL-C1000/2000C/M/Y	$249.00	$115.00

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Model	Genuine	TONNY
KX-FA54E	$43.00	$18 Twin Pack
KX-FA55A	$43.00	$19 Twin Pack
KX-FA134	$82.00	$35 Twin Pack
KX-FA136	$63.00	$26 Twin Pack

Lexmark Toner Cartridges

Model	Genuine	TONNY	Model	Genuine	TONNY
Optra E/E+	$ 142.00	$ 59.00	E230/232/330/332	$ 129.00	$ 55.00
E120 prebate	$ 115.00	$ 55.00	E310/312 (3k)	$ 185.00	$ 73.00
E210	$ 162.00	$ 49.00	E320/322 (3k)	$ 162.00	$ 82.00
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Model	Genuine	TONNY
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PG-40	$34.00	$26.00
CL-41	$35.00	$26.50
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BCI-3eC/M/Y	$20.40	$ 5.70
BCI-6BK	$24.10	$ 5.70
BCI-6C/M/Y	$24.10	$ 5.70
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Model	Genuine	TONNY
TK-16H	$ 73.00	$ 61.00
TK-17	$103.00	$ 35.00
TK-18	$123.00	$ 38.00
TK-310	$130.00	$ 59.00
TK-510K	$ 98.00	-
TK-510C/M/Y	$172.00	-

Panasonic Toner Cartridges

Model	Genuine	TONNY
UG-3313	$242.00	$ 73.00
UG-5545	$242.00	-
KX-PDP8 Toner for KXP7100/7110	$136.00	$ 68.00

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Model	Genuine	TONNY
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18C0035 (#35)	$49.30	$27.00
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18L0042(#83)	$62.60	$23.90

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Model	Genuine	TONNY
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LC-37C/M/Y	$16.60	$ 6.50
LC-38BK	$24.50	$ 5.00
LC-38C/M/Y	$15.90	$ 6.50
LC-47BK	$34.60	$ 5.00
LC-47C/M/Y	$20.80	$ 6.50
LC-57BK	$34.50	$ 5.00
LC-57C/M/Y	$20.80	$ 6.50

HP Ink Cartridges

Model	Genuine	TONNY
C8721WA (#02BK)	$28.20	$11.00
C8771/2/3/4/5WA (#02C/M/Y/LC/LM)	$16.60	$ 8.20
C6615DA(#15)	$42.40	$14.10
C4936A (#18BK)	$30.00	$16.00
C3967/8/9A (#18C/M/Y)	$23.50	$16.00
C9351AA (#21)	$24.00	$16.00
C9352AA (#22)	$27.30	$21.00
C8727AA(#27)	$28.90	$14.10
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C6656AA (#56)	$30.60	$15.20
C6657AA (#57)	$48.90	$23.00
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CC641WA(#60XL) BK	$45.00	$27.00
CC644WA(#60XL) Color	$51.00	$29.00
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C9364WA (#98)	$26.40	$15.80
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CLT-409S BK for CLP-310/315,CLX-3170/3175	$ 74.00	-
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CLP-510D7 BK	$153.00	$ 92.00
CLP-510D5 C/M/Y	$171.00	$ 92.00
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CLP-600A C/M/Y	$184.00	$119.00

HP Toner Cartridges

Model	Genuine	TONNY
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Q6511X	$ 316.00	$ 69.00
Q2612A	$ 106.00	$ 45.00
Q2613A	$ 109.00	$ 45.00
C7115A	$ 95.00	$ 45.00
Q7516A	$ 276.00	$ 99.00
C4127X	$ 194.00	$ 59.00
CB435A	$ 95.00	$ 49.00
CB436A	$ 107.00	$ 49.00
Q1338A	$ 235.00	$ 85.00
Q5942A	$ 226.00	$ 95.00
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C8061X	$ 194.00	$ 59.00
C4092A	$ 90.00	$ 45.00
C4096A	$ 153.00	$ 59.00

HP Color Toner

Model	Genuine	TONNY
CB540A	$109.00	$ 75.00
CB541/2/3A	$ 99.00	$ 75.00
Q6000A	$116.00	$ 78.00
Q6001/2/3A	$126.00	$ 78.00
Q3960A/C9700A	$126.00	$ 65.00
Q3961/2/3A	$151.00	$ 65.00

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Brother Toner Cartridges

Model	Genuine	TONNY
TN-2025	$ 86.00	$ 49.00
DR-2025	$156.00	$ 62.00
TN-2150	$ 88.00	$ 49.00
DR-2125	$155.00	$ 69.00
TN-3060	$123.00	$ 49.00
TN-3185	$128.00	$ 49.00
TN-3290	$159.00	$ 49.00
DR-3215	$215.00	$ 89.00
TN-6600	$117.00	$ 49.00
TN-7600	$122.00	$ 49.00
TN-8000	$ 47.00	$ 16.00
TN-04BK	$257.00	$ 89.00
TN-04C/C/Y	$257.00	$ 89.00
TN-12BK	$139.00	$ 72.00
TN-12C/M/Y	$281.00	$ 105.00
TN-155 BK	$139.00	$ 89.00
TN-155 C/M/Y	$196.00	$ 99.00

Samsung Laser Toner

Model	Genuine	TONNY
SCX-4100D3	$123.00	$ 49.00
SCX-4216D3	$123.00	$ 49.00
SCX-D4200A	$123.00	$ 49.00
SCX-4521D3	$126.00	$ 49.00
SCX-D4725A	$123.00	$ 64.00
SCX-5312D6	$ 96.00	$ 70.00
SF-5100D3	$123.00	$ 49.00
ML-1210D3	$123.00	$ 49.00
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MLT-D108S	$ 95.00	-
MLT-D109L	$145.00	-
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ML-2150D8	$219.00	$ 82.00
ML-2250D5	$144.00	$ 59.00
ML-D3050B 8k	$288.00	$ 86.00

Canon Toner Cartridges

Model	Genuine	TONNY
CART 303(Q2612A)	$ 89.00	$ 45.00
CART 308(Q5949A)	$ 89.00	$ 49.00
CART 310 II(Q6511X)	$ 264.00	$ 79.00
CART 312(CB435A)	$ 81.00	$ 49.00
CART 313(CB436A)	$ 86.90	$ 49.00
EP-22 (C4092A)	$ 75.00	$ 45.00
EP-26	$ 99.00	$ 45.00
CART307BK(Q6000A)	$ 99.00	$ 78.00
CART307C/M/Y(Q6001/2/3A)	$ 105.00	$ 78.00
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CART311BK	$ 155.00	-
CART311C/M/Y	$ 199.00	-
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FX-9	$ 120.00	$ 49.00
CARTN	$ 231.00	$ 59.00
CARTU	$ 105.00	$ 45.00
CARTW	$ 149.00	$ 53.00
E-31	$ 195.00	$ 55.00

Konica Minolta Color Laser Toner

Model	Genuine	TONNY
QMS Magicolor 2300/2350 BK	$121.00	$ 69.00
QMS Magicolor 2300/2350 C/M/Y	$161.00	$ 69.00
QMS Magicolor 2400W/2430DL/2450 BK	$119.00	$ 85.00
QMS Magicolor 2400W/2430DL/2450 C/M/Y	$164.00	$ 85.00

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